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ABSTRACT

Documenting several elements relative to regional research on community services in 10 northeastern states as experienced in the U.S. Department of Agriculture's Regional Research Project NE-77 (1971), this monograph represents the NE-77 technical committee's effort to identify basic research issues re: the delivery of community services in rural areas. Data derived from primary and secondary sources constitute the basis for the 13 papers presented in this monograph. Papers are grouped and titled as follows: (1) Conceptual Framework ("On the Classification of Community Services"; "Differential Interpretations of Estimates Based on Time-Series and Cross-Sectional Data"; "An Approach to the Measurement of Service Quality"; "The Distribution of Income Transfers Resulting from the Pricing Structures of Subsidized Merit Goods"; "Linkages in a Community Services Delivery System Model"; "Voluntarism and Rural Community Services"; "Mix of Services at the Community Level"); (2) Methodological Considerations ("The Unit of Control"; "Site Selection Considerations for Regional Representation"; "The Provider Side of Community Services"; "The Consumer and the Human Service System"; "The Role of Case Study Approach in Community Services Research"); (3) Regional Research Considerations ("Users of Research Results and Sequencing of Events in Researching Community Services"). (JC)

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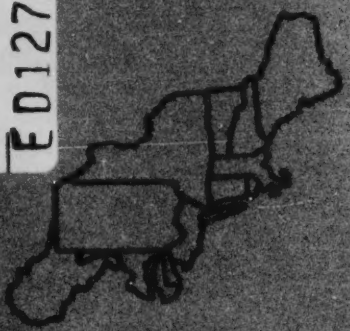

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A NORTHEAST REGIONAL
COMMUNITY SERVICES STUDY

Methodological Considerations in Researching Community Services in the Northeast

New Jersey Agricultural Experiment Station
Publication . September 1975

METHODOLOGICAL CONSIDERATIONS IN RESEARCHING COMMUNITY SERVICES IN THE NORTHEAST

Northeast Regional Research Publication

by

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Editor's Introduction

Typically, a technical committee's basic task has been to generate data and publications of regional significance on a "researchable problem." Regional efforts are encouraged so that problems common to several states can be examined and a critical mass of expertise can be comprised for the effort. When the problem is well defined and easily agreed upon, sampling, questionnaire development, data processing and analysis can proceed rapidly. However, when the problem is not precisely known or easily defined, the initial thrust of the technical committee's activities has to be with problem identification as opposed to data generation. Also, when a multidisciplined approach is needed to solve problems "in total," the task is complicated even further. Researchers realize that this is the framework within which decision making takes place as opposed to a piecemeal approach. This monograph represents the effort of the NE-77 technical committee to identify some of the basic issues that must be dealt with in researching the delivery of community services in nonmetropolitan areas. Forthcoming publications generated by the technical committee and by the several cooperating state experiment station researchers will detail the analysis of the empirical data.

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INTRODUCTION[1]

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Purpose and Background of Report

The purpose of this report is to document several elements of the process of conducting regional research on community services in the northeastern United States as experienced in USDA Regional Research Project NE-77. This project, Community Services for Nonmetropolitan People in the Northeast, began in February 1971 and had participants from 10 states in the Northeast.[2]

In conducting the research, the technical committee reviewed a number of concepts, frameworks and methods for achieving the research objectives. Some of these were employed in the project, others were discarded. The technical committee decided that the various conceptual and methodological issues and decisions should be documented as part of the process of conducting research on community services. Administrators encouraged such documentation and the present report was prepared.

There were two primary reasons for preparing this report:

1. The NE-77 technical committee would have for future reference the various issues involved. The committee viewed the present project as semiexploratory. It was seen as an attempt to make progress on conceptualization of research on community services and at the same time collect data to answer some elementary questions and provide material for more relevant conceptualization of research.
2. To provide others who are researching or may research community services on a multidisciplinary and multistate basis with the experiences and thinking of this technical committee. Thus, the work by NE-77 would enable other researchers to progress in an efficient manner.

Rationale for Study of Community Services in the Northeast

It is generally recognized that the kind, quality, and cost of public and private community services—such as education, health and medical care, banking

[1]Major portions of this section are excerpts from the original NE-77 project proposal and from a paper by S.M. Leadley entitled "Objectives and Models for Regional Research on Community Services for Nonmetropolitan People in Northeastern U.S., NE-77" in Olaf F. Larson (ed.), *Papers of Workshop on Current Rural Development Research in the Northeast*, Northeast Center for Rural Development, Ithaca, New York: Cornell University (1972), pp. 138-155.

[2]Connecticut, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Vermont, and West Virginia.

and credit, fire protection, and diverse forms of transportation—are among the important influences upon rural development. The range in community services among rural localities, and among rural as compared with urban localities, tends to be very great.

It should be possible to measure these variations and to look for causes of the differences which are amenable to human control. Policy alternatives may then be shaped, and some of the consequences of such alternatives be predicted with some accuracy. The reduction in inequities in the availability and quality of community services among rural areas and between rural and urban areas should improve rural living, contribute to the development of rural communities, be a factor working toward a better rural-urban balance in the distribution of population, and reduce the heavy social costs of rural-to-urban migration.

Within the Northeast, there are widely varying situations with respect to underlying conditions, such as density and distribution of the population, which bear importantly on the access to and the cost of services. There are wide variations in the economic resource base. There are variations among states in policies to aid local communities as well as in the formulae intended to equalize accessibility, quality, and costs of services.

There appear to be striking differences in the ways that the several states of the Northeast resolve public issues bearing upon community services. Observations in the states of the region would provide a wider range of experience than could be obtained in one state. Such observations should yield findings of potential application to more diverse local circumstances.

The Northeast is distinctive in respect to its length of settlement and long exposure to urban dominance. It is an ideal area in which to study experiences which not only would have applications unique to the region, but also might help clarify and sharpen understanding of interregional differences. For example, in much of the Northeast in contrast to other regions, the rural population has recently been increasing, not decreasing. In New York, as a further example, the rate of increase in rural population has been as great as that for the urban population.

The literature of the past half century is rich with community studies, many of which have included information on service delivery. Studies of organizational leadership structures have also been made and these have included assessments of the adequacy of service delivery. Likewise, many economic analyses of community financing, economies or diseconomies of size, or cost-benefit analyses of a particular service have been reported. In contrast to the main objectives of NE-77, these studies have rarely focused on a "mix" of services, with the basic objective being one of trying to find new and more effective forms of delivery to aid rural development.

Objectives of NE-77

The objectives of NE-77 were as follows:

1. To determine and evaluate the type, location, distribution, accessibility, organizational, financial, and quality variations in services for people of the nonmetropolitan Northeast.
2. To determine interrelationships and explanatory factors with respect to the delivery of these services.

3. To identify alternative institutional arrangements for the delivery of community services and to estimate the political, social, and economic consequences of these alternatives, now and in the future.

In essence, the first objective relates to the description of the dependent and control variables; the second objective is concerned with the determination of explanatory variables and relationships; and the third objective provides a mechanism for testing policy implications of alternative institutional arrangements including results from analyses carried out under objectives one and two.

Methodology

To achieve the three project objectives, a number of methods were employed. For the first and second objectives, sites were selected throughout the cooperating states. Details on site selection are given in a later chapter in this report. For each site, data were collected on agencies providing those services on which the technical committee had decided to focus. In some instances, secondary sources such as service and telephone directories were used. Where these were found insufficient a contact was made with a key informant or with the agency itself. Data on type, location, organization, and distribution features of services were obtained in this manner.

Data on accessibility and finance were obtained from interviews with a sample of users (consumers) residing in the selected sites. The consumer interview was also used to obtain data on service contacts and barriers to service use.

Achievement of the second objective depends heavily on analysis. Analysis included consideration of secondary data such as population characteristics as well as primary data collected for this project. Analysis was in terms of providers of services and consumers of services. The analysis was cross sectional. To collect information from providers and consumers, common instruments were used uniformly at all sites.

Regarding the third objective, alternative institutional arrangements for the delivery of selected community services were identified including those used in the Northeast and other areas, as well as potential new arrangements. These alternatives were derived from the data collected for objective I, other published sources, and synthesized systems. Alternative forms studied included differing geographical arrangements and mixes of services performed by a specific institutional unit, e.g., special districts vs. units of general government. These alternatives included various forms of interlocal cooperation.

Several additional notes about objectives and methodology or procedures will put the project into better perspective. Although the first objective was clearly descriptive in nature, the delineated seven characteristics contained in it tend to overshadow other concerns. The project focused on the effectiveness and methods of service delivery. An alternative wording for the first objective might be: To describe how services are delivered, and to estimate the effectiveness of the institutions presently delivering these services.

The second objective does not explicitly declare itself to be a model building step but it is essentially just that. It was felt that if informal observations of variations in both adequacy of service and effectiveness of delivery across the ten-state region are empirically confirmed, subsequent research for explanatory factors will involve the use and refinement of conceptual and statistical models.

Nonmetropolitan Defined

The procedures subcommittee of the technical committee wrestled with the definition of the nonmetropolitan population in the Northeast. After considering the consequences of alternative definitions, the technical committee adopted for the criterion of "nonmetropolitan" the 30 percent level of nonurbanized population in a county. That is, counties with 30 percent or more of their population classified as nonurbanized were included as nonmetropolitan counties. This definition permitted the inclusion of some SMSA counties which had considerable nonurbanized ("nonmetropolitan") population outside the central city and its adjacent urbanized areas.

Consideration of Consumers of Research Findings

In designing the project and its procedures, there was an awareness of the need for assuring the utilization of the research output. Through maintaining contacts in public and private sectors, the researchers hoped to increase access to both needs for research and action growing out of research findings. That is, building ties in both the private and public sectors before being locked into an irreversable research design permitted not only identification of the most needed information but also provision of results to those who would be most likely to use them.

Definition of Rural Development

The research project reviewed in this report was seen by the USDA as contributing information needed in the development of nonmetropolitan or rural areas of the U.S.[3] Policy makers in the USDA viewed community services as an important component of rural development. To place the research in perspective, then, a brief discussion of the concept of rural development is necessary in this introductory section.

One of the best and more recent discussions of rural development is contained in the report entitled *A New Life for the Country: A Report of the President's Task Force on Rural Development*. Although rural development is never "defined," the report's statement on the purpose of rural development aids in understanding the term:

> The purpose of rural development is to create job opportunities, community services, a better quality of living, and an improved social and physical environment in the small cities, towns, villages and farm communities in rural America. [1]

The impetus for concern at the national level with rural development appears to derive from efforts to stem the many environmental, social, psychological and economic problems faced by continued increasing growth of metropolitan areas. It is assumed that the development of rural areas, that is, making them more attractive in terms of job opportunities and quality of living, will lead to a

[3]The term "rural" in this report refers to persons living in areas classified as nonmetropolitan and in those rural areas contained within metropolitan areas. In the Northeast there were 17 million persons so classified in the 1970 Census. This definition of rural, and the number of persons so classified, was taken from a report recently prepared by a task force on rural development research in the Northeast: *Rural Development Research in the Northeast for the Next Five Years—A Framework: Task Force Report to the Northeastern Regional Agricultural Research Planning Committee*, September 1973.

decline or a halt of rural-to-urban migration, and an increase in urban-to-rural migration. The net result would be a shifting of population from metropolitan to nonmetropolitan areas.

Underlying this hoped-for state of affairs are many assumptions about the economic and social desirability of growth in rural areas; public and private investment in services; location of services; goals and abilities of urban and rural residents, and other dimensions of social and economic life. These issues are discussed in the next section, "Rural Development and Community Services."

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1. *A New Life for the Country: The Report of the President's Task Force on Rural Development*, U.S. Government Printing Office, March 1970, p. 1.
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RURAL DEVELOPMENT AND COMMUNITY SERVICES[1]

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Sequencing in Rural Development

One question which poses significant problems for federal, state, and local levels of government concerns the sequence of steps in rural development and particularly the place of services in this sequence. Will tax concessions, industrial development loans and other incentives and mechanisms attract a suf-

[1]Parts of this section are excerpts from a paper by S.M. Leadley entitled "Objectives and Models for Regional Research on Community Services for Nonmetropolitan People in Northeastern U.S., NE-77" in Olaf F. Larson (ed.) *Papers of Workshop on Current Rural Development Research in the Northeast*, Northeast Center for Rural Development, Ithaca, New York: Cornell University (1972), pp. 138-155.

ficient industrial base to lead to establishment of services necessary to hold and/or attract residents? Or is it necessary first to provide services which will promote or accelerate economic growth? If so, are there certain services which should be developed first? What are the relevant roles to be played by public services, over which one or more levels of government has control, and by private services which rely on fees or voluntary contributions for their establishment and operation? These are but a few examples of the many questions that could be and are being asked about sequencing.[2]

Development as a Process

Further understanding of the role of services in rural development can be obtained by considering rural development as a process rather than a point at which one arrives. This emphasis on process has special meaning. With this orientation the technical committee has been more inclined to think of development in terms of dynamic models rather than static models or more in the sense of a recursive programming mode rather than as a single pass.

The setting of goals in the context of the larger community service-mix (a package of services available in the community) is a necessary element in rural development. Goals are needed for establishing a desirable community service-mix. There are both direct and indirect components of the community that influence the goal-setting process such as the characteristics of the population and their needs, agency activities, institutional constraints, existing personnel and agencies and extracommunity legislative pressures.

Systems in Service Delivery

Consideration needs to be given to the idea of community service delivery systems. While this phrase is treated lightly in conversation it is heavily weighted down with conceptual freight. Researchers need to recognize a number of definitional limits of systems, namely: (1) each service system is identifiable and has at least social if not biological and physical boundaries; (2) each system is comprised of a set of interrelated parts that are sensitive to each other's action; (3) each system is in part an open system exchanging resources actively with its environment; and (4) each system must have some adaptive capacity to respond to changes in its environment. These definitional elements from systems theory may result in a number of strong constraints on the nature of data collected and the forms of analysis attempted.

Reducing clarity in this area is our awareness that system boundaries appear to vary depending on one's point of view when beginning the analysis. One may start with the client and find that clients see no system at all. On the other hand, using the same service, one may start with the provider and find that the provider views the service as relatively well organized, with clearly defined boundaries, and having a moderately high level of interdependence among its parts.

Another complexity dealing with system boundaries is that they tend to be dynamic. Systems are continually involved not only in the process of boundary maintenance but also contraction and extension. Certain classes of consumers

[2]The NE-77 technical committee has discussed some of these questions at times but no final positions have been taken. An assumption underlying the work of the project seems to be that regardless of whether services are antecedents or consequences of growth "adequate" services need to be provided to all persons in nonmetropolitan areas.

may be excluded or included depending how they affect the system's goal achievement. For example, in cases where efficiency has been stressed and effectiveness of service to a client group deemphasized, systems have screened clients to increase their desired output at the expense of certain members of the client group. In recent years the loss ratio for the Farmers' Home Administration has been criticized as being too low. Given its legislative mandate this agency should make loans to people under especially difficult financial situations and, all other factors being equal, its loss ratio ought to be higher than commercial banks. But again, the agency's output is influenced by its clients and poor risks may be screened out too rigorously. These examples point toward the general proposition that the goal receiving strongest administrative support will have an effect on boundary activities of the system.

A further issue to be dealt with in the project is the idea of a *community* service-delivery system. We know that systems are linked. These systemic linkages occur between systems in the same service area and across service boundaries. It is hypothesized, for example, that premature residential subdivision in a community tends to divert resources from other services in order to meet needs created by new residents. In this case heavy investments are made in new sewer and water systems or in school buildings rather than in programs of health, education, and social services for the original residents.[3]

Problems of Service Adequacy

In considering adequacy it is important to keep in mind that one's point of view makes a considerable difference.[4] A mobile home, for example, may be viewed by the consumer as an adequate form of housing. Those who provide these homes also have a positive assessment of them. The manufacturers say that mobile units meet the housing needs of a substantial population segment. On the other hand, many communities view mobile homes as debits. That is, these homes are supposed to generate little real estate tax revenue and create high service demands. More than one community has adopted legislation excluding the use of mobile homes within its boundaries. The definition of adequacy depends in part on one's choice of data source.

There is also concern about the distributional aspects of the adequacy definition. That is, while the total supply of a service may be great enough to meet the basic needs of the total population, the equity of this distribution may be such that there are serious unmet needs. In fact, segments of the population may not receive the service at all.

Probably one of the most difficult aspects in the adequacy definition for which researchers have yet to arrive at a satisfactory answer is the combination of individual services into a service mix. A community may have a number of

[3]Comments on systemic linkage are not meant to suggest that all consequences are negative. It is quite clear that through both formal and informal linkage in private and public sectors economies of size have been achieved. Many questions concerning system autonomy accompany these systemic linkages. In some areas these issues have been resolved, while in others they continue to be the source of intersystem conflict. In part, this is a reflection of our fragmented approach to community building.

[4]The reader is referred here to the papers on service adequacy by C. Babb, G. Carruthers, and N.S. Urquhart, P.H. Gessaman and G.D. Rose, P.F. Hernandez, and A.S. Williams in *Working Papers on Rural Community Services*, compiled by S.M. Leadley. University Park, Pa.: The Pennsylvania State University, Department of Agricultural Economics and Rural Sociology (1972).

adequate services but lack one or two critical services which may cause the community to be perceived, either from the outside or the inside, as having an inadequate service base.

Finally, one needs to recognize that definitions of adequacy vary from one segment of the population to another. For example, adequacy definitions for housing vary widely by socioeconomic status. The functions performed by housing vary with housing for the working class providing predominantly shelter, for the middle class providing not only shelter but recreation in terms of backyard and family room, and, for upper class families, the home provides shelter, recreation, and prestige. We also know that adequacy definitions of health care vary by stages of health care. That is, adequacy in the preventive stage is defined by different criteria than adequacy in stages of diagnosis, treatment, rehabilitation and terminal care.

The final concept is "community." When we think of community as an arena within which services are delivered, we immediately face the fact that functioning communities are dynamic and refuse to be bounded by political decisions of the past. Old political boundaries continually get in the way of the systems' attempts to adapt to environmental changes. As systems move toward an equilibrium state after environmental change, increasing pressures are brought to bear on existing political boundaries. While at one point in American history communities may have been the arena within which goal-setting for community service-delivery systems took place, considerable doubt has been shed on this through informal observation and evaluation. Goal-setting with regard to the service-delivery mix appears to be a complex interaction between forces within and outside the community.

From another standpoint, one may use community to define a public for whom access is mandatory for certain services. That is, choice is forgone with regard to certain mandatory public services. The fee-for-use system of payment is abandoned in favor of broad-based financing through the public sector. While this may not seem to be immediately relevant one finds, for example, that an overemphasis on college preparation of secondary students in the United States may represent a case in point. Choice has been eliminated on the part of many students based on decisions made in the tax-supported public sector by educational administrators. Another illustration growing out of our experience in the Northeast is the environmental control act passed in Vermont which takes out of the hands of the individual landowner many decisions regarding maintenance of certain environmental qualities. Further, if Congress is successful in its quest for a national health insurance program, we may well see a stronger federal hand in this area at the expense of individual decision-making.

Finally, at the community level the degree of formality of systemic linkages is extremely ill-defined. If the community is going to be defined as a system, then what are its boundaries and which of the multitude of parts are involved in intrasystem relations? Alternatively, one might look at systems of communities rather than focusing on isolated communities.

Welfare vs. Development Functions of Services

To some extent there is a dilemma for researchers as to whether to focus on services as a factor in rural development or on services as a contribution to individual and family welfare. The two are intertwined since people (families) make

up rural areas or communities. However, in the first case the focus is primarily on community level variables whereas in the second case the focus is more on the household or family level. The questions to be asked are rather different for each case. To say that the two approaches to research are different is not to say they are inconsistent or incompatible. The point is that in giving attention to both approaches, neither is pursued to its fullest.[5]

Types of Services

Somewhat related to the above discussion is the decision as to which services to select for study. An important component of this decision is arriving at some method of classifying services. Services can be classified in several different ways. One way is in terms of whether the service is public or private. Another would be in terms of how the services are delivered. Some are more personal in nature such as health, education, and welfare. In these services, some person is usually directly involved at the point of delivery. In other services, such as water supply, sewage disposal and solid waste disposal, "hardware," rather than persons, plays the dominant role in delivery.

Another mode of classification of services is in terms of what they do for people and communities. Some services help families cope with the environment, while others, such as mental health, aid families in coping with socioemotional problems. Still other services, for example education, have evolved to help individuals prepare for work and other roles to be performed throughout life. If the focus of the research is on services for rural development, one classification scheme might be better than another. Also, one might be better than another for research focusing on family service needs.[6]

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S.M. Leadley, "Objectives and Models for Regional Research on Community Services for Nonmetropolitan People in Northeastern U.S.," in *Papers of Workshop on Current Rural Development Research in the Northeast*, Olaf Larson (ed.), Northeast Center for Rural Development, Ithaca, New York: Cornell University (1972), pp. 138-155.

[5]To some extent, this is the dilemma of NE-77. The project is interested in looking at the provision of services at selected sites across the region and relating this to some measures of growth or decline of the sites. At the same time the project is aimed at examination of consumers' perceptions of availability of services and problems in use. The benefit to be gained in this approach is that the researcher can examine the nexus between provision and utilization of selected services at selected sites. At the same time, information about services is made available for considering services in relation to population and economic growth.

[6]In NE-77, lengthy consideration was given as to which services would be included for study. The final list of services to be researched was a compromise in terms of importance of the service, accessibility of the data and the specific interests of the researchers.

ON THE CLASSIFICATION OF COMMUNITY SERVICES

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The specific services different individuals and groups might include under the rubric of community services will likely vary from individual to individual and from group to group.[2] In the case of NE-77, the services studied were selected on the basis of what appeared to be an intuitive consensus on a core set of services with additional services included on the basis of a simple majority vote. The purpose of this section is not to defend, oppose, or advocate this approach in classifying and studying community services. Instead, an attempt is made to outline one of many possible classification schemes and to strongly suggest that ***some type of general classification scheme is usually desirable*** when initiating research on community services.

The desirability of developing a general classification scheme stems from the belief that both the process of developing a scheme and the scheme itself tend to sharpen one's focus, provide guidance for asking the appropriate research questions, and provide a systematic overview of the total situation.

The process of developing a classification scheme is likely to prove particularly valuable in interdisciplinary research efforts such as NE-77. This is so because different disciplines tend to have different orientations with respect to defining and classifying community services. The approach outlined in this paper relies heavily on the discipline of economics.

The initial premise of this particular approach is that almost any listing of community services would include an overwhelming majority of services whose production, consumption, distribution, and/or financing were substantially and directly influenced by forces operating outside the private market place. These forces can be generically labeled and thought of as "public involvement." However, the presence of public involvement does not mean that the services included in such a list would be the ***exclusive*** domain of the public sector. Indeed, some of the more fruitful researchable themes involve comparisons between the public and private sector, e.g., comparisons between public and private educational services. It should also be noted that public involvement may be either sanctioned governmental involvement or the types of collective action initiated by voluntary associations and nonprofit organizations.

Using "public involvement" as a focal point, one logical and fundamental approach to classifying community services is to classify them according to the underlying reasons for this public involvement. In a market economy the most basic reason or rationale for this involvement is the presence of market imperfections. These imperfections are of concern because they lead to a nonoptimum or inefficient use of scarce resources, and public involvement is an effort

[1]The author gratefully acknowledges the useful comments of Frank M. Goode and Charles O. Crawford.

[2]The terms "community services," "human services," "social services," and "public services" are frequently used more or less synonomously. However, in the interest of simplicity and consistency the only term used will be "community services."

to counter this situation. The following classification scheme builds upon this general theme by classifying community services according to specific types of market imperfections.

Classifying Community Services According to Type of Market Imperfections Eliciting Public Involvement

1. *Services in response to external effects.* The presence of external effects or externalities means that the total (public plus private) costs or benefits of producing or consuming a particular good or service are not fully absorbed by the private producer or consumer. For example, a polluting factory imposes an external cost on those adversely affected by its pollutants and is therefore not paying the full costs of production unless it compensates those adversely affected. On the other hand, an individual who sprays his swampy backyard so mosquitos no longer breed there receives only part of the benefits from his actions, i.e., his neighbors are receiving external benefits from the spraying operation. Because external effects are not generally considered in the making of private decisions, nonoptimal (from a societal perspective) quantities of production and consumption result. To wit, if the factory had to pay for cleaning up its pollution or had to compensate those adversely affected by its pollutants, its costs would rise and production would be curtailed. In the case of the mosquito spraying, if all those who benefited from the spraying operation were made to contribute to the costs of the operation it is likely that more spraying would occur. The problem, then, becomes one of trying to achieve a level of production and consumption that is consistent with a societal optimum. One approach is through publicly induced measures such as a subsidization of goods and services exhibiting external benefits, and taxing and regulating goods and services displaying external costs. These measures become the nucleus of many community services, e.g., free inoculation clinics (a subsidized activity resulting from external benefits associated with the private consumption of these services) and land use control (a regulatory activity resulting from external cost associated with private decision making in land use).
2. *Services in response to natural monopolies.* Natural monopolies are characterized by sharply decreasing average costs of production in relation to the size of the market being served. These monopolies generally require a large initial capital outlay causing a considerable waste if duplicate facilities are allowed to exist. On the other hand a single unregulated private producer is in a monopoly position from which he can become exploitive in terms of not passing the lower average cost of production on to the consumer. A commonly used approach designed to solve this dilemma is having the production of natural monopolies undertaken or closely regulated by the public. Most of the community services included in this category are of the "hardware-type" such as electrical, telephone, sewage, and water services.
3. *Services in response to indivisibilities in consumption.* Indivisibilities in consumption mean that more than one individual can simultaneously consume the same good or service without any additional costs being incurred over and above that which would be incurred if only one person was using the service. Goods and services displaying indivisibilities in consumption are frequently labeled collective goods or services with the classic textbook example being that of a lighthouse. It is argued that after a collective service is

once available, "societal welfare" will be maximized only if the service is used at full capacity. This is so because no additional costs will be incurred in moving from a utilization rate of less than full capacity to full capacity yet additional benefits will be accruing as utilization is increased. One way to encourage utilization to a point of full capacity is to provide the service free—a policy that is obviously not compatible with the profit motives of the private sector.[3]

Two subcategories of collective services are those requiring an extraordinarily high marketing or exclusion cost in order to be able to separate those who would be willing to pay to consume the service from those who would not be willing to pay and those requiring a more modest exclusion cost. Examples fitting into the first category in which exclusion is extremely expensive (or simply impossible) are the lighhouse, national defense, and radio signals in addition to such aesthetic or recreational-type phenomena as a flock of wild fowl, a view of the Grand Canyon, or a splendid sunset. Examples of services fitting into the second category are streets and highways, police and fire protection, libraries, museums, and parks and playgrounds.

4. *Services in response to "inequitable" patterns of income distribution.* The market economy is efficiency-oriented and largely neutral to the question of equity or income distribution. In short, we "vote" in the marketplace with dollars which means the market responds to effective demand rather than humanistic needs. Hence, those with the most dollars may have their luxuries met before the poor even have the barest of necessities. This is an untenable situation to most of those who are poor as well as to others who are not but who feel a loss of satisfaction from knowing that human anguish exists.[4] One solution to such an untenable situation is public involvement designed to redistribute income. This involvement is manifested via such public services and programs as the public welfare system, the Food Stamp program, etc.
5. *Services in response to other imperfections in the private market.* The four previous types of market imperfections illustrate some of the more dramatic cases for public involvement in the production, consumption, distribution, and/or financing of community services. These imperfections represent violations of certain assumptions which must hold if the market economy is to operate at peak efficiency. Less dramatic imperfections could also be fully developed if space permitted. In short, it can only be noted that additional imperfections occur and that a number of services exist in response to the need to minimize the adverse effects of these specific imperfections. For example, a perfectly competitive market ecomony assumes that "perfect" information exists regarding prices, quality, technology, etc. This information is needed so producers can make efficiency-enhancing (i.e., rational) decisions and so consumers can respond to those producers who are most ef-

[3]The above-described rationale for zero pricing via public involvement is not infallible. However, the purpose here is not to become argumentatively involved in this difficult area but to develop the line of reasoning which frequently prevails and therefore leads to public involvement.

[4]At first glance this situation may not appear to be a type of market imperfection; however, in the final analysis it is because the nonpoor are experiencing an external diseconomy from knowing that human anguish exists. In more rigorous terms the diseconomy occurs because the assumption that individual utility functions are independent does not hold. This assumption is basic in providing the undergirdings for relying on the market economy.

ficient in meeting their demands. Because "perfect" information does not exist a number of community services have been designed to increase the quantity and accuracy of information. Examples are public employment services providing information on the labor market and those regulatory services needed to monitor the "truth-in-lending" and "truth-in-packaging" legislation.

Summary and Conclusion

One approach to classifying community services is to focus on the underlying rationale for the public involvement that affects the production, consumption, distribution, and/or financing of community services. Five situations or rationales—all stemming from the presence of market imperfections—that one can use to form service classification categories are:

1. Services in response to external effects.
2. Services in response to natural monopolies.
3. Services in response to indivisibilities in consumption.
4. Services in response to "inequitable" patterns of income distribution.
5. Services in response to other imperfections in the private market.

Although a number of specific services will not fit neatly into a single category many of these "marginal" cases can be categorized comfortably if a serious effort is made to isolate the ***primary rationale*** for the service rather than emphasizing ***unintended consequences***. For example, the financing of highways by a gasoline tax has the effect of transferring income from the owner of the luxury car to the owner of the economy car. However, most would agree that the ***primary rationale*** for public highways is not to redistribute income but is to take account of indivisibilities in consumption.

A number of interesting embellishments can be superimposed on the above classification scheme. For example, a two-dimentional matrix could be developed with the second dimension defining the type of public involvement such as (1) public ownership of a service, (2) public subsidization or taxation of a service, and (3) public regulation of a service. Hence, in the case of natural monopolies, municipally owned water systems fit into the first category, rural electrical cooperatives fit into the second, and public utilities commissions into the third (Table 1). Another embellishment would be to simultaneously consider the level or hierarchy of public involvement such as (1) local, (2) state, and (3) national. Hence, in the case of income redistribution, local churches and charities might fit into the first category, General Public Assistance payments into the second, and Social Security into the third (Table 2).

These embellishments and, indeed, the basic classification scheme, are not sacred. The point to be emphasized is that the process of developing such a scheme and the scheme itself can be extremely useful heuristic and pedagogical devices when undertaking research in an area as broadly defined as that of "researching community services."

Table 1
Classification of Community Services According to (a) Type of Market Imperfection Eliciting Public Involvement and (b) Type of Public Involvement

Type of public involvement	Type of market imperfection eliciting public involvement: Presence of external effects	Presence of natural monopolies	Presence of indivisibilities in consumption	Presence of inequitable patterns of income distribution	Presence of other imperfections in the private market
	Examples of services				
Public ownership	Hydro-electric power	Public water and sewer systems	Public streets and highways	Bureau of Indian Affairs hospitals	Depends on specific market imperfections under consideration
Public subsidization or taxation	Scientific research	Rural electrical cooperatives	Mercenary police forces	Medicare and Medicaid	
Public regulation	Land-use control	Public Utilities Commission	Enforcement of endangered species legislation	Monitoring amount of of income subject to garnishment	

Table 2
Classification of Community Services According to (a) Type of Market Imperfection Eliciting Public Involvement and (b) Level of Public Involved

Level of public involved	Type of market imperfection eliciting public involvement				
	Presence of external effects	Presence of natural monopolies	Presence of indivisibilities in consumption	Presence of inequitable patterns of income distribution	Presence of other imperfections in the private market
	Examples of services				
Federal	Federal, state, and local legislation providing various types of ecological and environmental control services	Federal Aviation Agency	National defense	Social Security	Depends on specific market imperfection under consideration
State		Public Utilities Commission	State highways	General public assistance	
Local		Municipal water and sewer systems	Police and fire protection	Local charities	

DIFFERENTIAL INTERPRETATIONS OF ESTIMATIONS BASED ON TIME-SERIES AND CROSS-SECTIONAL DATA

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Decisions must be made regarding the choice of time series and/or cross-sectional data collection for estimating relationships and testing hypotheses. However, this choice cannot be made independently of the nature of the problem and desired interpretation of results. Accordingly, this paper addresses an aspect which is often overlooked by social science (and other) researches—viz., the differential interpretations of time-series and cross-sectional estimations and, hence, the proper choice of data types for a given research problem. The selection of the type of data (time series or cross sectional) is all too often dictated by data availability without regard for the implications for interpretation. In other cases estimations using one type of data (usually cross sectional) are used to provide "prior" restrictions on parameters for use in an estimation process using the other type of data.

The contention here is that few empirical researchers fully realize the implications of either selecting cross-sectional or time-series data or of combining time-series and cross-sectional observations. To be sure, some aspects of these interpretations are treated rather rigorously in the literature. However, the group of applied researchers which remains conversant with such journals as *Econometrica*, *Journal of the American Statistical Society*, and *Review of Economics and Statistics*, does not exhaust the set. Further, even among those who remain in contact with these types of sources, the observed tendency is to become engrossed in the empirical expediencies required in applied research with the result that important subtleties are often overlooked or at least not reported.

This paper presumes, therefore, to restate for some, and introduce for others, some differences in the interpretation of estimations based upon time-series and cross-sectional data. The purpose is not to go into more detail than already exists in the literature, but rather to restate arguments in a language understandable to a larger group of researchers. This objective is pursued as follows: The second section sets out the distinction between the alternative types of data; some literature background and reasons for combining time-series and cross-sectional estimations are provided in part three; and econometric and interpretational problems are outlined in the following section, followed by a summary of the major arguments made.

Time-Series and Cross-Sectional Data

The sample observations from which researchers make inferences are of two types: cross-sectional and time-series data. Cross-sectional data consist of observations on values of variables at a given point in time (or, pragmatically, during a specified interval of time). Each observation on a variable X_1 may be its value in a particular locality or in a given institution (e.g., a household). Thus the primary reference of cross-section data is spatial—the element se-

parating observations is a difference in spatial locality at a given point in time.

Time-series data consist of observations on a given variable at different points in time (or during different periods). Each observation is separated from the others by its occurrence at a different time rather than in a different place.

The researcher is, of course, seldom fortunate enough to have a plethora of both types of data. Which is more abundant depends upon the particulars of the research problem under investigation. The choice of data type, however, affects the interpretation of the outcome as is demonstrated in section four. To illustrate, some research using both types of data in the estimation procedure is briefly discussed. The examples are taken from economic research.

Research Using Both Time-Series and Cross-Sectional Data

Perhaps the major use of a combination of data types has been in estimating relationships where cross-sectional data are used to estimate some parameters of the relationship and in turn these estimates are introduced into time-series regressions to estimate the remainder of the model. Notable examples include: [6], [10], [11], [12], [15], and [16]. In each case, the extraneous information in the form of parameter estimates from the cross-section data was introduced in the time-series analysis as known with certainty. Several ([2], [13], and [14]) suggest introducing this extraneous information (regarding values of coefficients) in a sampling theory context. In this latter context, the assumption that the extraneous information is known with certainty is relaxed and hence the results are no longer "conditional" estimates of the time-series regression. More recently, [1] provides a Bayesian procedure for pooling time-series and cross-section data and simultaneously estimating all parameters.

In the past 15 years, concern over the quality of aggregate economic data has led to heavier reliance on microdata (especially cross sections). Two factors were primarily responsible for this change in emphasis.[1] The first involves the more frequent occurrence of multicollinearity in time-series relative to cross-sectional data. Second, because many aggregate economic hypotheses were basically scale models of microbehavior, hypothesis testing with cross sections was rather appealing.

Perhaps the major illustration in economic research concerns the area of demand estimation. In order to overcome the often harmful effects[2] of multicollinearity in time-series regression and to obtain more accurate estimates of income elasticity of demand, researchers have turned to the extraneous information procedures cited above. As a simplified example, the estimation might proceed as below. First, one obtains the coefficient on income from cross-sectional budget information for which the price variables are presumed constant. This estimate is in turn multiplied by the vector of time-series observations on income and the product is subtracted from the vector of time-series observations on quantity demanded to form a new dependent variable.[3]

The combined use of time-series and cross-sectional data is intended in this case to reduce the adverse effects of multicollinearity (by "splitting up" the in-

[1]These factors are identified by [7].

[2]These effects are that the precision of the estimates falls, investigators are led to delete variables incorrectly on the basis of conventional t-tests of significance, and estimates become sensitive to particular sets of sample data. See [4, p. 160].

[3]For a more complete treatment of this approach and its implications for precision, refer to [9].

fluence of the explanatory variables) in order to provide more accurate estimates of the parameters. The question must be posed, however, "What structure[4] does the researcher wish to estimate?" The relevance of this question is the focus of the following section.

Differential Interpretations of These Data Types

Especially in the area of demand studies, the sort of behavior measured by cross-sectional data is likely to be long-run in nature, while time-series observations typically reveal a short-run character. This case is made by [8] regarding food demand functions and [7] for firm investment functions. Further, the sorts of biases which may occur in estimation, using the alternative types of data, are different. Some of these biases and reasons for differential coefficient estimations under time-series and cross-sectional analyses are outlined below.

Retaining the demand example, it is a simple matter to illustrate that the coefficients of the cross-section estimation may depend upon the point in the time series at which the cross section is taken. For example, if new goods appear as an increasing function of time, with large numbers appearing outside the consumption items in the analysis,[5] then the commodities competing for income will be continually enlarging. Hence, the income coefficient will tend to decline over time and income elasticities estimated from cross-sectional data near the beginning of the time series would be larger than if the data were taken from a later point in the time series. Likewise, any shifts in the distribution of income over the time-series period of analysis is likely to make the cross-sectional estimate of the income slope dependent upon the time frame within the series.

Further, [8, p. 389] points to rigidities in consumer behavior as a basis for the different structures associated with the data sources. For example, preference for a good (e.g., vintage wine) may be more dependent on one's training, background, and education than on current income changes. To the extent that income positions and backgrounds are correlated, the cross-sectional data may reveal differences associated with income strata which may have resulted from cumulative training over many years.[6] Hence, the cross-sectional data may reflect a longer-run behavior than the time-series equivalent.

The reader can run through a similar reasoning process for other research topics. For a rural community social services study, for example, the argument can be made that cross-sectional data taken from a variety of communities, each at varying stages of development and adjustment, may reveal a longer-run process than would time-series data for a single community which has had time to adjust to changing needs in some areas but not in others.

To be sure, the degree of the discrepancy depends upon a number of factors, including the length of the time series, analytical methods employed, and the choice of the period to include. For example, time-series regressions which include a trend term, or which employ first differences to remove the trend, will

[4]This question is asked by [8] who follows it with a more detailed treatment than is provided here.
[5]Technically, of course, the goods which are included in the analysis should be chosen on the basis of "separability." See [5] for a summary of the major forms of separability.
[6]This observation is essentially similar to the Duesenberry-Modigliani "ratchet effect" which centers on the persistency of consumption habits. Assuming, then, that the majority of observed households (for example) have experienced their relative real income for some time, the cross section reveals long-run effects, while for a time-series analysis any income shift might be considered temporary and consumption habits may not change immediately to those of the new income group.

reflect shorter-run behavior. Likewise, time-series analyses of periods of little trend will reveal a basically short-run behavior and vice versa. Similarly, cross-sectional investigations taken at a point in time corresponding to rapid growth or change could very well reflect short-run or transitory influences. The considerations outlined above, however, do suggest that the two basic data types may reveal substantially different structures with alternative interpretations, and hence that the researcher ought at least to be cognizant of the implications for his investigation.

A number of biases (mostly related to specification errors) common to estimation with the respective data types are treated in [7]. For example, if explanatory variables operate according to a pattern of distributed lags,[7] and if the appropriate (weighted) lag terms are omitted a least-squares bias is likely to arise. For cross-sectional data, behavior is apt to be less explicitly dynamic and hence the dynamic specification errors which bias time-series estimates are usually less serious in cross sections. Other biases specific to data type have been rigorously treated in the literature. Since these sources of bias differ and may in many instances be rather stable, the incorporation of static (cross-sectional) biases into a time-series framework may be a rather poor decision.

On the other hand, if the time-series estimate is a function of a representative cross-sectional estimate, the use of both data types may be useful for prediction (since one estimate can be translated into the other regardless of the underlying causal factors leading to the discrepancy). In this case, if the relations were to undergo a structural change, then such a discovery by the cross-sectional analysis permits the alteration of the time-series estimates without the long time interval which must otherwise expire before the change is statistically detected. Second, to the extent that cross sections have more degrees of freedom, the estimated coefficients merit more reliance.

Summary

This paper serves as a reminder to those of us who are prone to overlook the specific interpretations which are imposed upon us by our choice of data types (as well as model specification, choice of time framework, etc.) that these effects ought to be understood and considered simultaneously with model specification and data selection. We emphasize the basic long-run/short-run dichotomy reflected by cross-sectional and time-series data, respectively. This was illustrated with a simple demand example. The reader can draw parallels in other subject areas. The differential behavior reflection and bias structure suggest that one ought to be wary in interpreting results of estimations based on one type of data where extraneous information in the form of estimates resulting from the use of the other type is used. Likewise, in choosing among cross-sectional and time-series data, one ought to also consider the nature of the structure he is trying to estimate, rather than simply abundance of observations.

[7]Refer to Reference 3 for a rather lucid survey of distributed lags.

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AN APPROACH TO THE MEASUREMENT OF SERVICE QUALITY

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If one is to attempt to evaluate the adequacy of a particular human service delivery system, one must know something about both service quantity and quality. Consequently, it is unfortunate that quality is a rather complex and ill-defined "entity" which is very difficult to measure.

It is argued here that this difficulty in measuring service quality is due only in part to an inadequacy in the availability of good data. The major difficulty with measuring service quality, or any other quality, stems from its being complex subjective responses to vectors of objective conditions. Obviously, this particular understanding of quality, as a subjective entity, excludes many of the usual concepts of quality which are, in fact, only specialized quantity concepts which relate to nonlinear or discontinuous phenomena of the physical world.

With an exclusively subjective notion of quality, overall quality will be unreliably represented by an index defined over a set of given quality dimensions. In fact, the care with which such dimensions are measured might count for very little, since within each individual the infinitely various dimensions of quality are aggregated intuitively in a nonadditive manner. Consequently, many if not most attempts to get at the essence of quality, through an ever finer dissection of the fine features of reality, may well lead nowhere. This methodological dead-end might be termed *the trap of descriptive realism*.

It may be tentatively concluded, therefore, that if quality is to be measured at all, it must be measured indirectly. However, even a scheme of indirect measurement must deal with or relate to objective phenomena. At present, two basic types of "objective" indirect measurement appear feasible. The first type involves personal interviews. This is clearly a promising approach. Unfortunately, however, people do not always say what they mean, or believe what they say. Consequently, it is often very difficult to assess the reliability of quality measurements obtained using this approach.

The second type of indirect measurement involves the use of theoretical models to estimate the relative magnitudes of an individual's (or group's) net assessment of the quality of, say, a social service facility. This type of measurement works by developing a behavioral model that attempts to mirror that part of an individual's (or group's) actions which relates to his (its) use of that facility within his (its) context of alternatives. This approach is currently in a primitive state of development.

The primary focus of this paper is upon developing a version of this second type of indirect quality measurement scheme. However, before indicating how a particular, simple model can be used to measure quality, it is useful to note one of the "extra" advantages of this approach. In particular, by using predictive or forecasting tests, it is possible to use the same behavioral model which has been employed to measure (or estimate) quality levels to also assess the empirical reliability of those measures.

The assumptions used in the quality measurement model are as follows:

A) Preference assumptions

(P-1) A client experiences declining marginal utility from consuming increasing quantities of service hours from each of two different service facilities.

(P-2) A client experiences increasing marginal disutility from using his own time in "matching" the service hours which he purchases.

(P-3) A client believes that the service hour qualities or efficiencies of the two service facilities are different. However, his perception of the level of a facility's service hour quality is a constant which is invariant with the number of hours which he purchases.

(P-4) A client experiences decreasing marginal utility from consuming increasing dollar amounts of "other goods."

(P-5) A client's preference parameters may or may not be functions of socioeconomic variables (e.g., income).

B) Production assumptions

(PR-1) The benefit which a client derives from purchasing service hours is experienced only in the current period, and is the result of a fixed proportions production process, involving equal numbers of client hours and service hours.

(PR-2) Each service facility handles the same kinds of cases.

C) Market assumptions

(M-1) The prices of each of the two kinds of service hours are taken as given by a client.

(M-2) The price of "other goods" is constant.

(M-3) A client chooses quantities of goods and "hours" that maximize his utility.

(M-4) The total market demands for the two types of service hours are obtained through an aggregation of individual demands.

The above assumptions concerning preferences and service production are embodied in the following preference function:

$$U = x^{\alpha}(T - T_1 - T_2)^{\beta}(V_1T_1 + V_2T_2) \tag{1}$$

and budget constraint

$$y = x + p_1T_1 + p_2T_2 \tag{2}$$

where the various variables and parameters are defined as follows:

α, β, γ: nonnegative preference function parameters

x: dollar value of other goods, per period

T: maximum amount of time, per period, which might be spent "consuming" service hours

T_1, T_2: per period service hours purchased from facilities 1 and 2, respectively

V_1, V_2: client quality weights which apply to hours of service purchased from facilities 1 and 2, respectively

P_1, P_2: prices of service hours purchased from facilities 1 and 2, respectively

y: client income, per period

Making use of the first three market assumptions and the method of Lagrange leads to the following first-order conditions, where the lagrangian multiplier is λ.

(3a) $$\alpha L/\alpha x = \frac{\alpha}{x}U - \lambda = 0$$

(3b) $$\alpha L/\alpha T_1 = \left[\frac{-\beta}{(T - T_1 - T_2)} + \frac{\gamma V_1}{(V_1T_1 + V_2T_2)}\right] U - \lambda p_1 = 0$$

(3c) $$\alpha L/\alpha T_2 = \left[\frac{-\beta}{(T - T_1 - T_2)} + \frac{\gamma V_2}{(V_1T_1 + V_2T_2)}\right] U - \lambda p_2 = 0$$

(3d) $$\alpha L/\alpha \lambda = y - x - p_1T_1 - p_2T_2 = 0$$

Finding solutions to these conditions involves the following two nonlinear functions in service hours T_1 and T_2:

(4) $$T_1 = F(T_2) = \frac{-B \pm \sqrt{B^2 - 4AC}}{2A}$$

where:

$$A = p_1v_1(\alpha + \beta + \gamma)$$

$$B = [(-p_1v_1)(T - T_2)(\alpha + \gamma) + (p_1)(v_2T_2)(\alpha + \beta) + (-v_1)(y - p_2T_2)(\beta + \gamma)]$$

$$C = [(-p_1)(T - T_2)(v_2T_2)\alpha + (-1)(v_2T_2)(y - p_2T_2)\beta + (v_1)(y - p_2T_2)(T - T_2)\gamma]$$

and

(5) $$T_2 = g(T_1) = \frac{-B^* \pm \sqrt{B^{*2} - 4A^*C^*}}{2A^*}$$

where:

$$A^* = p_2v_2(\alpha + \beta + \gamma)$$

$$B^* = [(-v_2p_2)(T - T_1)(\alpha + \gamma) + (p_2)(v_1T_1)(\alpha + \beta) + (-v_2)(y - p_1T_1)(\beta + \gamma)]$$

$$C^* = [(-p_1)(T - T_1)(v_1T_1)\alpha + (-1)(v_1T_1)(y - p_1T_1)\beta + (v_2)(y - p_1T_1)(T - T_1)\gamma]$$

Substituting expression (5) into (4) gives

(6) $$T_1 = f(T_2) = f(g(T_1))$$

which can be solved numerically. Once T_1 is obtained, T_2 is found by using (5), and x is computed using the budget constraint (2). Since multiple values of T_1 and T_2 will be computed, it is necessary to select only those real, nonnegative pairs of values which maximize a client's utility. In some cases, either T_1 or T_2 will have to be given a zero value in order to attain a maximum.

Planar sections cut from the clients' three-dimensional preference surfaces are presented in Diagram A. In studying part 1 of this diagram, the following partial derivative is useful in trying to get a feel for the changing trade-offs between T_1 and T_2, when "other goods," x, is held constant, and the amounts of T_1 and T_2 are allowed to vary.

(7) $$\frac{\partial T_1}{\partial T_2} = (-1)\left(\frac{V_2}{V_1}\right)\frac{\left[\{T - T_1 - T_2\}^{-\frac{1}{V_2}\left(\frac{\beta}{\gamma}\right)}\{V_1T_1 + V_2T_2\}\right]}{\left[\{T - T_1 - T_2\}^{-\frac{1}{V_1}\left(\frac{\beta}{\gamma}\right)}\{V_1T_1 + V_2T_2\}\right]}$$

Attention should also be directed to the lines of constant utility contribution in Diagram A, part 1.

(8a) $(T - T_1 - T_2)^{\beta} = C'$ (------)

(8b) $(v_1T_1 + v_2T_2)^{\gamma} = C''$ (-.-.-.)

In some cases, positive quantities of both goods will be consumed, as at point A, while in other cases, only one good is consumed, as at point B.

Since most of the reliable data on service hours consumed is available only for groups of clients, it is typically necessary to aggregate individual choices to obtain the more usable data on group choices. In this process of aggregation, it may or may not be appropriate to assume that one or two of the clients' preference parameters (α, β, γ) are functions of some socioeconomic variables.

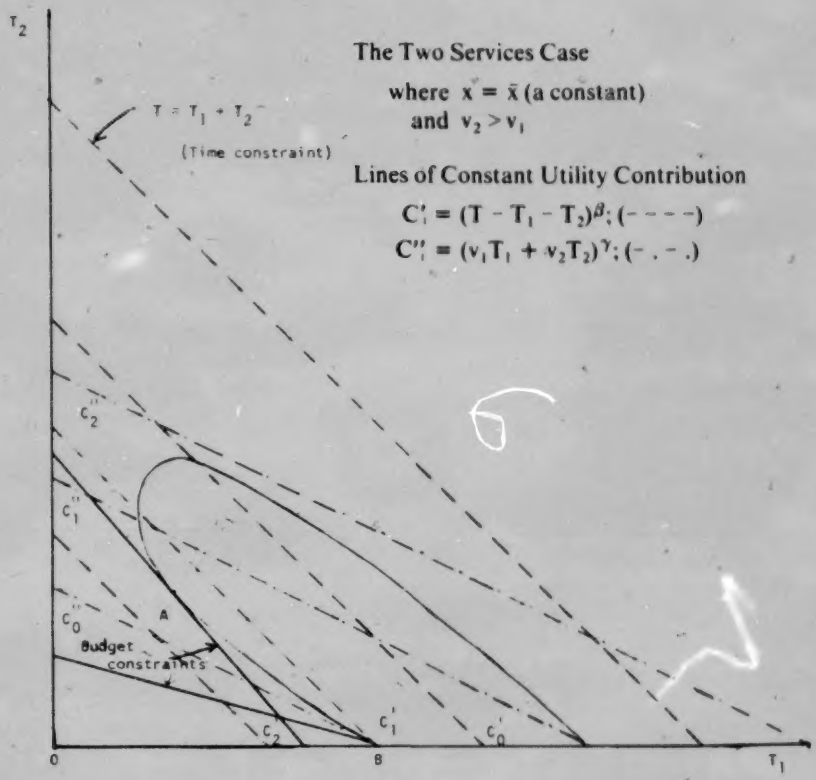
Estimates of the quality parameters v_1 and v_2 are obtained using either one of two approaches. In the first approach, the individual or aggregated "service hour" model is fit to time series data, and then the v_i's are selected to minimize a weighted sum of the variances of the difference between estimated and actual quantities, x, T_1, T_2.

In the second approach, simulation experiments with the "service hour" model are run, while v_1 and v_2 are varied, so that the implied service hour demand elasticities and cross elasticities approach those obtained from some prior study.

The above description of a "modeling" approach to measuring or estimating service quality is brief. However, it is hoped that the general flavor of this indirect approach is communicated and, of course, it is appropriate to note that the sample model presented here is in principle easily generalized to handle the case of three or more service facilities.

DIAGRAM A

The Optimal Consumption of Two Services
T_1 and T_2 of Differing Qualities v_1 and v_2



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THE DISTRIBUTION OF INCOME TRANSFERS RESULTING FROM THE PRICING STRUCTURES OF SUBSIDIZED MERIT GOODS

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Background

In recent years, the public sector has provided subsidized merit goods and services (such as food stamps and medicare) to needy individuals and families. In general, the public subsidies for such merit goods have been justified on the basis of considerations which relate to two important areas of public policy.

First, positive externalities may be generated when certain merit goods are consumed. For example, an impact of the Food Stamp program may be to raise the average level of labor productivity. In particular, the household's ability to purchase food at reduced prices through the Food Stamp program may lead it to increase its purchases of higher-quality food which in turn makes its members more healthy and productive.

Second, the particular distribution of incomes generated by the market economy is probably not just, since the distribution of talents and skills within the general population is quite unequal and largely random. Given this situation, it is not surprising that some amount of progressive income redistribution is generally perceived by political leaders as being socially desirable.

With regard to the development of reasonable public policies in these two areas, it is significant that the subsidization of merit goods can generate both positive externalities and a flow of redistributive income transfers.

The Problem

A casual glance at the structures of per unit subsidies associated with merit goods programs gives the impression that such programs are progressive in nature. Typically, for families of any given size, the per unit (of service) subsidy increases as family income decreases. Unfortunately, such progressivity may be largely illusory, since actual "in-kind" income transfers are functions not only of unit subsidies, but also of the actual quantities purchased, as well as of the underlying structures of household demands for merit goods.

Clearly, as a first step in evaluating the soundness of any particular merit goods pricing policy, it is necessary to determine whether the structure of implicit in-kind income transfers over the various income ranges is progressive or not. To make such a determination, it is necessary to know something about each income range's (intervals) most representative household's demand for merit goods. Obviously, it is inappropriate to assume that a household's demand for merit goods is completely unrelated to its income level.

However, while the development of an appropriately progressive structure of price subsidies would adequately handle the problem of the progressivity of in-kind income transfers, it would not, except by chance, deal appropriately with the externality problem noted earlier. In particular, the overall average level of

the subsidies of merit goods must be set in relation to the extra costs of transferring income through an in-kind program, instead of through a cash grant program.[1] Aside from possible differences in the administration costs of those two alternatives, the most important extra cost of an in-kind program is what is sometimes called a ***dead-weight loss***.[2]

In general terms, if the economic efficiency of a program is considered important, then the dead-weight loss caused by the program should roughly balance or equal the extra positive externalities which are also caused by that program. Of course, this particular approach to determining the optimum size of subsidies of an in-kind program must be substantially modified, if one of the objectives of that program is to transfer income to the producers of the service (or good) being provided.

A Digression on the Concept of a Dead-weight Loss

In general terms, a dead-weight loss can be specified as the difference between the consumer's valuation of being able to buy a commodity at a subsidized price, and the total subsidy involved in providing the quantity of goods he actually demands at that subsidized price. Diagram M can be used to help clarify the nature of the dead-weight loss concept, as it relates to some representative household.

In Diagram M, the quantity Q_0 of services will be purchases by the consumer at the unsubsidized price, P_{NS}. By providing a per unit subsidy of $(P_{NS} - P_{SS})$, the agency can induce the consumer to move along his traditional demand schedule DD, and to purchase the quantity Q_1 of services at the subsidized price, P_{SS}. Assuming that the costs of providing the service are constant, the total subsidy or resource cost of selling to the consumer at the price P_{SS} is clearly equal to the unit subsidy $(P_{NS} - P_{SS})$ multiplied by the quantity purchased, Q_1. Graphically this subsidy is represented by the area $P_{NS}P_{SS}T'U$.

Curiously, however, the value to the consumer of being able to buy the service at the subsidized price, P_{SS}, is typically somewhat less than the total resource costs (subsidy) of selling to him at the lower price. In particular, by using the concept of an equivalent (income) variation,[3] it can be shown that the value to the consumer of having the option to buy at the lower subsidized price is equal to the area $P_{NS}P_{SS}T'S'$ which lies under the consumer's real income constant demand curve d'd'. In other words, the consumer is indifferent between the two options of first purchasing what he wants (Q_1) at the subsidized price; P_{SS}, or second receiving an income grant of the amount $P_{NS}P_{SS}T'S'$ and purchasing what he wants (Q_1') at the nonsubsidized price; P_{NS}.

The difference between the resource cost of the subsidy, and the consumer's valuation of that subsidy is termed the dead-weight loss of the in-kind transfer. Graphically, the value of the dead-weight loss is given by the area S'UT'.

[1]It is assumed that a tax would be called whether or not an income transfer is affected by (1) subsidies of in-kind programs or (2) direct cash grants, and that the differences in the moneys needed for the two programs are not substantial.

[2]See H. Aaron, "Income Taxes and Housing," *American Economic Review*, 60:789-806, December 1970.

[3]See E. J. Mishan, *Cost-Benefit Analysis*, New York: Praeger, 1971, pp. 125-131,325-344.

Objectives

For practical reasons, the scope of this paper is largely restricted to the problem of estimating the distribution of real income transfers related to existing and/or potential merit goods pricing structures. Consequently, in this investigation, the overall aggregate of subsidies implicit in a particular merit goods pricing structure is treated as given. In addition, no attempt is made to estimate the positive externality benefits created by merit goods programs. However, it will become evident that it is not difficult (at least to a first approximation) to estimate the dead-weight losses caused by merit goods programs.

In order to determine the distribution, across income intervals, of the income transfers caused by the price subsidies in an in-kind program, it is appropriate to estimate the subsidy-induced income transfers accruing to representative consumers (or households) within each income interval. The theoretically best measure of such an income transfer, for any particular household, is given by the equivalent variation measure which was introduced in the previous section in connection with the dead-weight loss concept.

Briefly, as a review, an equivalent variation in the present context is that particular cash grant which would make a consumer indifferent between receiving the grant and buying the service at the nonsubsidized price; or receiving no grant and buying the service at the subsidized price.

In its simplest terms, the objectives of this paper are to develop a practical scheme for estimating the equivalent variation measures of the in-kind "cash grants" (income transfers), accruing to representative households in different income intervals. Once such "cash grant" measures are obtained for any particular program, it is then a fairly simple task to determine whether that program has a progressive or regressive price structure. Of course, the actual distribution of cash grants associated with any particular program will be a function not only of the structure of price subsidies, but, most importantly, of consumer incomes and preferences.

The Problem of Developing a Practical Measure of the Equivalent Variation Concept

The equivalent variation measure of a price subsidy is computed as the area to the left of an appropriately selected income compensated demand curve and between the nonsubsidized and subsidized price levels: the area $P_{NS}P_{SS}T'S'$ in Diagram M.[4] In order to obtain the required demand curve, it is necessary to have available both the traditional (nominal income constant) demand schedule, as well as the complete family of income-compensated demand schedules. It appens that these two requirements cannot be met by using traditional approaches to demand analysis.

Fortunately, the author has developed a new approach to estimating simultaneously both kinds of demand functions from cross-section data relating to merit goods. Regrettably, this new approach to demand analysis can only be applied under certain restricted, though normatively desirable conditions. These conditions are as follows. First, the agency supplying merit goods has a

[4]In computing the equivalent variation for a household, it is generally assumed that the "before" price which it faces is equal to the average cost of supplying the good in question. However, in some contexts, it is appropriate to work with some other "before" price, such as the household's reservation price which is that price at which the household leaves the market in question.

variable fee (price) schedule which is a step function of household income (i.e., all households within any one of several income intervals pay the same price for a service; while households in different income intervals pay different prices). Such a fee schedule may also be related to family size, etc. Second, the agency can and is willing to collect data on the distribution of quantities purchased by households within each of its price-related income intervals. And third, the agency places no (effective) quantity restrictions upon any individual household's purchases of merit goods. This particular condition is the one which is most often violated in practice. However, it should be noted that agencies which actually impose quantity restrictions (e.g., food stamps), in effect tend to turn their programs into ones involving pure income transfers. Ironically, this particular result destroys the key rationale for the existence of such agencies which is to use lower prices on merit goods to induce households to substitute toward consuming more of such goods.

Typically, demand analysis is concerned with the estimation of income and price elasticities of demand. Usually, estimates of these elasticities can be obtained only from time series studies where households' purchases of goods vary simultaneously with movements or variations in incomes ***and*** prices. Indeed, at a first glance it would appear that it should not be possible to use cross-sectional data to obtain estimates of price elasticities. In fact, for a good supplied through a competitive market, this deduction is a valid one. In particular, for competitive markets, cross-sectional data can only be used in estimating income elasticities, since at the moment of the survey, during which such data are obtained, all buyers face an essentially identical price. Fortunately, this last observation does not generally hold in the case of merit goods markets. The reason for this is that merit goods are sold in noncompetitive markets where overt price discrimination is practiced. Witness the fact that households lying in different income intervals are charged radically different prices. Clearly, for such markets, some sort of information about price responses should be obtainable from interhousehold comparisons. In fact, since the typical discriminatory structure of merit goods prices can be plotted as a step function of household income, it becomes possible, given certain general assumptions about preferences, to derive both income and price elasticities from cross-sectional data.

The (potential) ability of administrators of merit goods programs to use cross-sectional data to analyze the market demand for their product has several important consequences, two of which are noted here. First, it allows such studies to be carried out at low cost. And second, it permits the results of such demand studies to be fed back quickly, into the price setting process for a more efficient and equitable administration of their programs.

Key Assumptions Behind the Proposed Cross-Sectional Demand Estimation (CSDE) Technique

The main simplifying assumptions made about institutions and household preferences in setting up the cross-sectional demand estimation (CSDE) technique noted above are as follows:

(1) The fee (price) schedule for merit goods is a step function of household income. In other words, prices vary systematically between, but not within, certain income intervals.

(2) Legislated constraints upon the quantities which households might purchase do not exist.
(3) Households consume only two categories of goods: the merit good and "other goods" of which the latter is sold in a competitive market.
(4) Preference (orderings) structures are identical for all households who are members of the modal set. Households who are members of the modal set are identified in the following way. The members of the group of households, corresponding to any specified income interval, will purchase various quantities of the merit good. Corresponding to their particular distribution of purchases, it is assumed that there will be some modal purchase. A household is then defined as a modal household, if it is a member of that income interval, and also purchases that interval's modal purchase quantity. The modal set is comprised of all of the modal households drawn from all of the specified income intervals.
(5) The household's real-income constant demand curves are linear.
(6) The average income of households who purchase an income interval's modal quantity of merit goods is equal to that income interval's midpoint.

The method for carrying out the CSDE technique has the following features. First, it is a nonstochastic simultaneous equation technique, involving quadratic preference schedules between the merit good in question and all other goods. Second, it is applied to data relating to modal quantities purchased by households within each income interval out of a specified set of income intervals. Third, the traditional household (nominal income constant) demand functions are of a very general nonlinear form, and are presented in a tabular arrangement, as price-quantity points taken off of the underlying demand schedule. And fourth, the household's real income constant demand functions are linear in form, as was indicated earlier. By way of comparison, it may be noted that most empirical regression studies of markets typically assume that market (nominal income constant) demand curves are linear or log-linear in form.

The expanded and complete algebraic representations of these procedures are given in the Appendix.

The Three Stages in the Application of the CSDE Technique to the Problem of Optimally Pricing Merit Goods

The three stages which should be used in applying the CSDE technique are as follows. First, the existing merit goods price structures should be evaluated to determine for each income interval the modal households' equivalent variation (EV) measure of real income transfers, arising from the subsidized price. Second, at the existing subsidy level, a modified price structure for merit goods should be generated which would then lead to the desired form of the progressive structure of EV (real income)transfers across income intervals. Of course, peculiarities in the modal household's demand structure at different "levels" of its real welfare may well lead to an appropriate price structure which has a very nonregular appearance. Third, in a hypothetical budgeting exercise, the agency's overall budget should be varied to see how the dead-weight loss costs imposed by the "in-kind" income transfer program would vary in relation to the corresponding positive externality benefits generated by the program. On the basis of such computational experiments "better" agency budget recommendations could then be made.

To date, the first stage in the development of the CSDE technique has been carried out. In particular, the theory behind the CSDE technique has been developed. And in addition, a computer program has been written which makes practical the empirical application of the CSDE technique to the first stage of the merit goods optimal pricing problem. Work on developing programs to handle the second- and third-stage problems of optimally pricing merit goods is currently underway.

To give the CSDE technique a certain reality, a hypothetical illustration of how it is applied to the first stage problem is presented in the next section.

Real Income Transfers Resulting from the Pricing Policies of a Hypothetical Mental Health Clinic

To set the scene for thinking about the distribution of real income transfers from variable (income-related) fee schedules, it is appropriate to consider what is meant by progressive or regressive transfers. The typical profile of a set of progressive income transfers resulting from the subsidization of prices in a merit goods market might appear as in Diagram A. In effect the transfer schedule in Diagram A is merely a vertical shifting of a portion of a normal progressive taxation schedule. In contrast, the profile of an income transfer schedule which is regressive would look like the curve plotted in Diagram B. In its most basic terms the purpose of applying the CSDE technique in stage one is simply to determine whether the transfer consequences of a particular merit good price structure are progressive, as in Diagram A, or regressive, as in Diagram B. To obtain a feeling for how the CSDE technique actually operates consider the following hypothetical example.

Suppose that the publicly subsidized "XYZ" mental health clinic has an income-related pricing structure based upon the ten income intervals given in Diagram C. In addition, suppose it is known that prices per hour of services differ for households in different intervals, but are the same for all households within any given interval. In particular, the prices in question are given in Diagram D.

Clearly, it is then necessary to know something about the quantities which households purchase at different price and income levels if one is to determine both the average modal household's structure of demand (see Section VI), and its corresponding price-induced income transfers at different income levels. It turns out that sufficient data exist for this determination if the modal quantities purchased by households lying in the middle, lower, and top thirds (subintervals) of each price-related income interval[5] are measured. Diagram E provides an example of such data.

In effect, these data, together with the income and price data presented earlier, make it possible to separate income effects from price effects in explaining the observed pattern of demand of modal households.

Diagrams F2 and F8 present the results of applying the CSDE technique for the hypothetical XYZ mental health clinic. Regrettably, the demands of the CSDE technique are such that no output data are provided for the last (tenth)

[5]For households corresponding to any given price-related income interval, the price of a merit good is invariant. However, households both just above or below the endpoints of such an interval will be charged different prices from those which are charged within that interval.

interval and only partial output data is given for the first and next to last (ninth) intervals.

However, it is clear from the tabulated results that the hypothetical pricing scheme is quite regressive in its impact, in spite of the fact that on paper the structure of subsidized prices "looks" as though it should be highly progressive. The reason for this anomalous result can be found in the low "reservation" prices at which lower income households would completely withdraw from the market for mental health services. For these households, in relation to "other goods," mental health services are not worth a great deal.

The dead-weight losses created by the subsidized price structure of the XYZ mental health clinic vary substantially from one income interval to another. To appreciate both the magnitudes and variation in dead-weight losses, it will be recalled that a reasonable estimate of the dead-weight loss incurred by an "in-kind" income transfer program is equal to the difference between the price subsidy measure on the supply side of a merit goods market, and the equivalent variation measure on the demand side of that market. Some representative dead-weight losses for the XYZ clinic may be mentioned. For the modal household in the second income interval whose annual income is $2250, the dead-weight loss from the "in-kind" transfer is $143.42, which is 21 times the real income transfer to that household which was $6.58. In contrast, for the modal household in the eighth income interval whose yearly income is $11,250, the dead-weight loss from the "in-kind" transfer is $7.73, merely one-tenth of the real income transfer to that household which was $76.27.

Summary and Conclusions

The cross-sectional demand estimation (CSDE) technique which was presented in this paper constitutes a new tool which has a potential for aiding administrators to optimally structure price subsidies in merit goods programs. In particular, it should help them to set their prices better to bring about both an efficient use of resources, as well as an equitable distribution of in-kind income transfers.

One of the most important strengths of the CSDE technique is its ability to estimate both nominal and real-income constant demand curves from a single set of cross-sectional data which, in principle, is easily obtainable.

The most important test of the strengths and usefulness of the CSDE technique can be carried out only when a merit goods agency actually changes the price schedule for its goods. At that time the agency has the opportunity to directly check on the soundness of the set of assumptions embodied in the CSDE technique by observing how well the estimated nominal income constant demand functions actually predict what the various modal households purchase. If such predictions turn out to be good ones, then strong support would be given to the CSDE technique, and to the in-kind income transfer distributions which it generates.

Finally, it may be noted again that the basic analytical and conceptual structure of the CSDE technique is given in the Appendix.

APPENDIX

Part A: Basic Components of the Cross-Sectional Demand Estimation (CSDE) Technique.

Section 1: Data Requirements

Suppose that an agency supplying AP goods has a step function price structure which is composed of n intervals, as in Diagram G. For the purposes of collecting and aggregating data to be used in applying the CSDE technique, each income interval is divided into three equal subintervals. Corresponding to each income subinterval, the following three pieces of information are collected:

1) P_j: price per unit of service in the jth income interval.
2) YY_{jl}: midpoint of the lth income subinterval of the jth income interval; where $l = 1$ is the middle, $l = 2$ is the lower, and $l = 3$ is the upper subinterval.
3) Q_{jl}: modal quantity of AP good purchased by households in the lth income subinterval of the jth income interval.

Section 2: Computation of Income Elasticities and the Income Expansion Path

First, the average between income interval and income elasticity of demand (EY) is computed as

(2-1) $$EY_{j1} = .5 \times EY_{j2} + .5 \times EY_{j3}$$

where

(2-2) $$EY_{j2} = \frac{YY_{j2}}{Q_{j2}} \frac{(Q_{j3} - Q_{j2})}{(YY_{j3} - YY_{j2})}$$

(2-3) $$EY_{j3} = \frac{YY_{j+1,2}}{Q_{j+1,2}} \frac{(Q_{j+1,3} - Q_{j+1,2})}{(YY_{j+1,3} - YY_{j+1,2})}$$

Second, the constant QO_j in the constant elasticity income expansion path function

(2-4) $$Q = QO_j \times Y^{EY_{j1}}$$

is given as

(2-5) $$QO_j = Q_{j+1,1} \times Y_{j+1,1}^{-EY_{j1}}$$

Section 3: The Computation of Each Income Interval's Reference Indifference Curve

The determination of each income interval's "reference" indifference curve can be understood most easily through an examination of Diagram H. Points A and C are known, while point B and the quadratic preference surface passing through A and B are unknown. Basically, the task of finding the latter two entities is accomplished by solving the following system of five equations for the five unknowns: AR_j, BR_j, CR_j, $\overline{Q}_j$, and $\overline{Y}_j$.

(1) *Point A on Preference Function*

(3-6) $$Y_j = AR_j \times Q_j^2 + BR_j \times Q_j + CR_j$$

(2) *Slope at Point A of Preference Function*

(3-7) $$P_j = -2 \times AR_j \times Q_j - BR_j$$

(3) *Slope at Point B of Preference Function*

(3-8) $$P_{j+1} = -2 \times AR_j \times \overline{Q}_j - BR_j$$

(4) *Point B on Preference Function*

(3-9) $$\overline{Y}_j = AR_j \times \overline{Q}_j^2 + BR_j \times Q_j + CR_j$$

(5) *Point "B" on Preference Function*

(3-10) $$\overline{Y}_j = QO_j^{1/EY_{j1}} \times \overline{Q}_j^{+1/EY_{j1}}$$

where Q_j, P_j, P_{j+1}, EY_{j1}, and QO_j are known, and Y_j is given as

(3-11) $$Y_j = (YY_{j1} - P_j \times Q_j)$$

The basic information about modal household demand structures is locked into the computed reference indifference curves. For example, in addition to the income elasticities already specified, the household's price elasticity which corresponds to the *j*th real income constant demand curve, related to the *j*th reference indifference curve is

(3-12) $$EP_j(Q) = \frac{(-2 \times AR_j \times Q - BR_j)}{Q} \cdot \frac{1}{(-2 \times AR_j)}$$

Section 4: The Computation of Each Income Interval's Interpolated Indifference Curves

Unfortunately, the calculated income interval reference indifference curves are quite far apart, and consequently, it becomes desirable (perhaps necessary) to interpolate in some meaningful way between adjacent pairs of such curves. The following interpolation scheme seems to be a reasonable one in that the slopes of the interpolated indifference curves where they cross the *j*th income expansion path have the appropriate value of a $-P_{j+1}$, and in addition, the approach seems to minimize the chances that indifference curves will intersect by prorating the curvatures of adjacent reference indifference curves (in the computer program the possibility of such intersections is tested). See Diagram I.

Step 1: The interpolated budget constraint

The interpolated budget constraint is given as

(4-13) $$YYA_{jk} = (1 - \alpha) \times (\overline{Y}_j + P_{j+1} \times \overline{Q}_j) + \alpha \times YY_{j+1}$$

where $0 < \alpha < 1$
and α is a monotonic function of K
where K = 1, . . . *n* (*n* arbitrary).

Step 2: Computation of point D where the budget constraint YYA, having slope $-P_{j+1}$ intersects the *j*th income interval's expansion path

The coordinates of point D in Diagram J are found by solving the following system of two equations for: YA_{jk} and QA_{jk}.

(4-14) $$YYA_{jk} = YA_{jk} + P_{j+1} \times QA_{jk}$$

(4-15) $$QA_{jk} = QO_j \times YA_{jk}^{EY_j}$$

Step 3: The interpolated preference curve parameters AI_{jk} and BI_{jk} are computed

The slopes of adjacent real income constant demand curves are prorated in the following way to give values to AI_{jk} and BI_{jk}. Related to the *jk*th interpolated indifference curve is the proportional demand change "β" at price P_{j+1}, caused by moving from income $(\overline{Y}_j + P_{j+1} \times \overline{Q}_j)$ to YYA_{jk}.

(4-16) $$\beta = \frac{(QA_{jk} - \overline{Q}_j)}{(Q_{j+1} - \overline{Q}_j)}$$

This proportionate demand shift is then arbitrarily designated as the demand shift which "probably" would occur in the *jk*th interpolated indifference curve at a price of zero. The *jk*th quantity demanded at price zero would be

(4-17) $$QOA_{jk} = QLOA_j + \beta \times (QUOA_j - QLOA_j)$$

where

(4-18) $$QLOA_j = -BR_j/(2 \times AR_j)$$

(4-19) $$QUOA_j = -BR_{j+1}/(2 \times AR_{j+1})$$

Consequently, the slope of the *jk*th real income constant demand curve would be

(4-20) $$SA_{jk} = -P_{j+1}/(QOA_{jk} - QLOA_j)$$

Finally, the desired *jk*th preference function parameters are

(4-21) $$AI_{jk} = -.5 \times SA_{jk}$$

(4-22) $$BI_{jk} = SA_{jk} \times QDA_{jk}$$

Step 4: The interpolated preference curve parameter CI_{jk} is computed

Since the *jk*th interpolated indifference curve passes through point D in Diagram J, it follows that

(4-23) $$CI_{jk} = YA_{jk} - AI_{jk} \times QA_{jk}^2 - BI_{jk} \times QA_{jk}$$

Section 5: Computation of Traditional Nominal Income Constant Demand Curves

For any level of household (nominal) income (YR), points on the corresponding traditional demand function are found by solving the following system of three equations for the three unknowns: $PD_{jk}(YR)$, $QD_{jk}(YR)$, and $YD_{jk}(YR)$. See point E in Diagram K.

(1) *Slope at Point E of Preference Curve*

(5-24) $$-PD_{jk}(YR) = 2 \times AI_{jk} \times QD_{jk}(YR) + BI_{jk}$$

(2) *Point E on Budget Constraint*

(5-25) $$YD_{jk}(YR) = -PD_{jk}(YR) \times QD_{jk}(YR) + YR$$

(3) *Point E on Preference Curve*

(5-26) $$YD_{jk}(YR) = AI_{jk} \times [QD_{jk}(YR)]^2 + BI_{jk} \times QD_{jk}(YR) + CI_{jk}$$

Section 6: Diagramatic Explication of the Computation of the Equivalent Variation Measure of Real Income Transfers

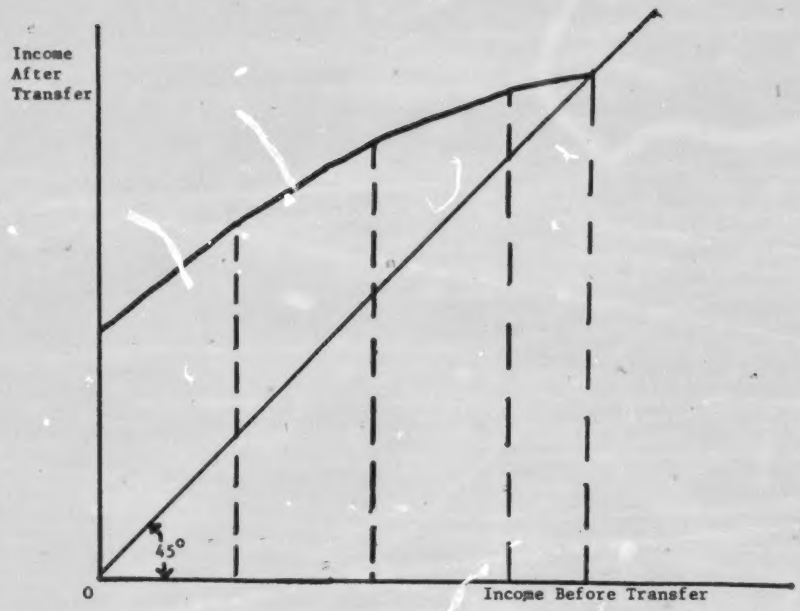
Basically, the (income) equivalent variation of a price fall can be made in either a preference diagram of the type shown in Diagram L or in a demand diagram of the kind given in Diagram M. For example, if the price of an AP good should fall from a level of P_{NS} to one of P_{SS}, then the corresponding equivalent variation can be represented as the interval $YY_{NS}YY^*$ in Diagram L or as the area $P_{SS}P_{NS}SU$ in Diagram M. For additional comments on these matters see Mishan's *Cost Benefit Analysis*, pp. 331-338.

Section 7: The Computation of the Dead-weight Loss Resulting from the In-Kind Program for Income Transfers.

An estimate of the dead-weight loss which follows from the lowering of the price of AP goods from P_{NS} to P_{SS} is given by the triangle STU in Diagram M.

DIAGRAM A

Progressive Subsidy Schedule



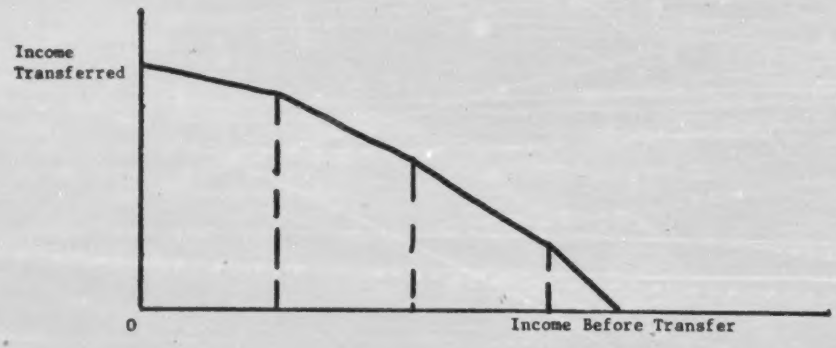
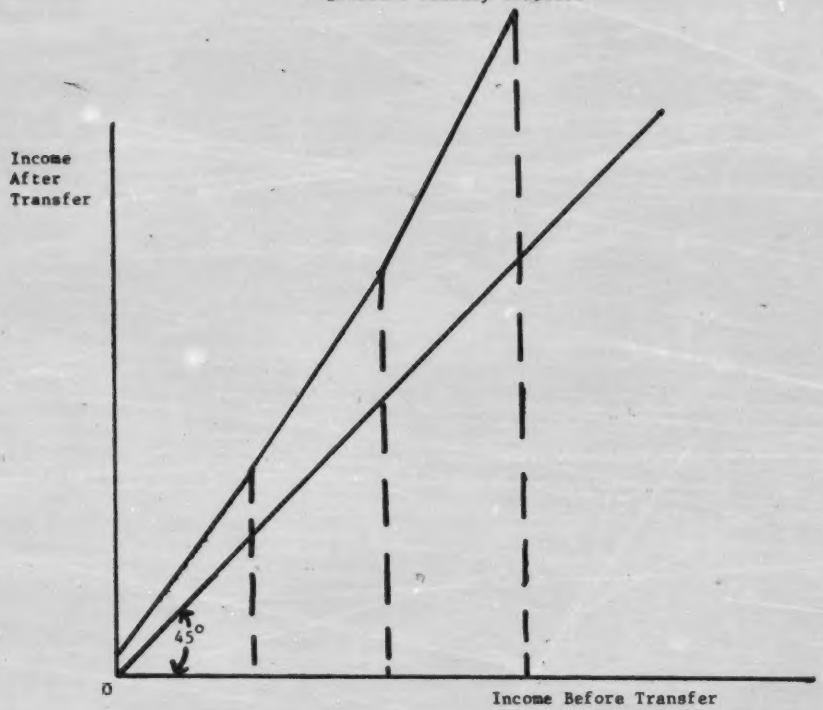


DIAGRAM B

Regressive Subsidy Schedule



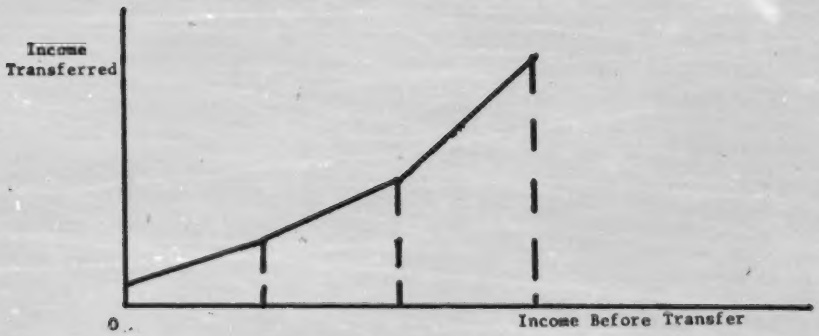


Diagram C

Basic Income Intervals

1)	0	-	1500	dollars
2)	1500	-	3000	"
3)	3000	-	4500	"
4)	4500	-	6000	"
5)	6000	-	7500	"
6)	7500	-	9000	"
7)	9000	-	10500	"
8)	10500	-	12000	"
9)	12000	-	13500	"
10)	13500	-	15000	"

Diagram D

Income Interval Prices

1)	4.0	dollars	per	unit
2)	5.0	"	"	"
3)	6.0	"	"	"
4)	7.0	"	"	"
5)	8.0	"	"	"
6)	10.0	"	"	"
7)	12.0	"	"	"
8)	14.0	"	"	"
9)	16.0	"	"	"
10)	19.0	"	"	"

Diagram E

Modal Quantities Purchased in Income Interval Sub-Intervals

Middle Third		Lower Third		Upper Third	
Q(1, 1.1)=	9.0000	Q(1, 1.2)=	6.0000	Q(1, 1.3)=	11.0000
Q(1, 2.1)=	10.0000	Q(1, 2.2)=	6.0000	Q(1, 2.3)=	12.0000
Q(1, 3.1)=	10.0000	Q(1, 3.2)=	7.0000	Q(1, 3.3)=	12.0000
Q(1, 4.1)=	10.0000	Q(1, 4.2)=	7.0000	Q(1, 4.3)=	13.0000
Q(1, 5.1)=	11.0000	Q(1, 5.2)=	9.0000	Q(1, 5.3)=	13.0000
Q(1, 6.1)=	13.0000	Q(1, 6.2)=	11.0000	Q(1, 6.3)=	14.0000
Q(1, 7.1)=	13.0000	Q(1, 7.2)=	12.0000	Q(1, 7.3)=	15.0000
Q(1, 8.1)=	14.0000	Q(1, 8.2)=	13.0000	Q(1, 8.3)=	15.0000
Q(1, 9.1)=	17.0000	Q(1, 9.2)=	16.0000	Q(1, 9.3)=	18.0000
Q(1,10.1)=	20.0000	Q(1,10.2)=	19.0000	Q(1,10.3)=	21.0000

P(1, 1)=	4.0000	Q(1, 1.1)=	9.0000	Q(1, 1.2)=	6.0000	Q(1, 1.3)=	11.000
P(1, 2)=	5.0000	Q(1, 2.1)=	10.0000	Q(1, 2.2)=	4.0000	Q(1, 2.3)=	12.0000
P(1, 5)=	6.0000	Q(1, 5.1)=	10.0000	Q(1, 5.2)=	7.0000	Q(1, 5.3)=	12.0000
P(1, 4)=	7.0000	Q(1, 4.1)=	10.0000	Q(1, 4.2)=	7.0000	Q(1, 4.3)=	13.0000
P(1, 5)=	8.0000	Q(1, 5.1)=	11.0000	Q(1, 5.2)=	9.0000	Q(1, 5.3)=	13.0000
P(1, 6)=	10.0000	Q(1, 6.1)=	13.0000	Q(1, 6.2)=	11.0000	Q(1, 6.3)=	14.0000
P(1, 7)=	12.0000	Q(1, 7.1)=	13.0000	Q(1, 7.2)=	12.0000	Q(1, 7.3)=	15.0000
P(1, 8)=	14.0000	Q(1, 8.1)=	14.0000	Q(1, 8.2)=	13.0000	Q(1, 8.3)=	15.0000
P(1, 9)=	16.0000	Q(1, 9.1)=	17.0000	Q(1, 9.2)=	16.0000	Q(1, 9.3)=	18.0000
P(1,10)=	19.0000	Q(1,10.1)=	20.0000	Q(1,10.2)=	19.0000	Q(1,10.3)=	21.0000

REAL INCOME CONSTANT DEMAND CURVE PASSING THROUGH THE NOMINAL INCOME CONSTANT DEMAND CURVE AT THE SUBSIDIZED PRICE OF 0.5000E 00 DOLLARS.

TABLE OF PARAMETERS RELATING TO SERVICE DEMAND AND CONSUMER SURPLUS: REAL INCOME TRANSFERS

INCOME ELASTICITY OF SERVICE DEMAND FOR HOUSEHOLDS WITH AN INCOME OF 2500. DOLLARS IN THE INCOME INTERVAL NUMBER 2.	PRICE ELASTICITY OF SERVICE DEMAND AT PRICE POINT P=SUB ON THE NOMINAL INCOME CONSTANT DEMAND FUNCTION	PRICE ELASTICITY OF SERVICE DEMAND AT PRICE POINT P=SUB ON THE REAL INCOME CONSTANT DEMAND FUNCTION	
0.2803E 01	-0.3519E 01	+0.3802E 01	
THE HIGHEST PRICE (P=MAX) AT WHICH THE HOUSEHOLD JUST ENTERS THE MARKET TO PURCHASE SOME OF THE SERVICE	THE SUBSIDIZED PRICE (P=SUB) AT WHICH THE HOUSEHOLD BUYS A QUANTITY OF 0.1000E 02 UNITS OF THE SERVICE	THE SUBSIDIZED PRICE (P=SUB) AT WHICH THE HOUSEHOLD BUYS A QUANTITY OF 0.1000E 02 UNITS OF THE SERVICE	
6.4750	20.2000	5.0000	
THE REAL INCOME TRANSFER IN GOING FROM 10 SERVICES TO PROVIDING SERVICES AT A PRICE OF 0.2700E 02 DOLLARS P=MAX	THE REAL INCOME TRANSFER IN GOING FROM 10 SERVICES TO PROVIDING SERVICES AT A PRICE OF 0.2700E 02 DOLLARS P=MAX	THE REAL INCOME TRANSFER IN GOING FROM PROVIDING SERVICES AT PRICE A 0.2700E 02 (P=MAX) TO PRICE B 0.4900E 01 (P=SUB)	QUANTITY CONSTRAINED INCOME TRANSFER MEASURE IN GOING FROM A PRICE A 0.2700E 01 (P=MIN) TO PRICE B 0.2700E 02 (P=MAX)
6.4752	P=MIN IS GREATER THAN P=ES	6.4752	100.0000

SELECTED POINTS ON THE SERVICES DEMAND CURVE WHERE HOUSEHOLD INCOME IS 11750.0000 DOLLARS

QD=	0.1675E	02	PR=	0.5471E	02	QD=	0.1572E	02	PR= 0.9794E 01
QD=	0.2078E	01	PR=	0.5273E	02	QD=	0.1602E	02	PR= 0.9568E 01
QD=	0.4704E	01	PR=	0.5139E	02	QD=	0.1612E	02	PR= 0.9542E 01
QD=	0.4572E	01	PR=	0.5032E	02	QD=	0.1622E	02	PR= 0.9117E 01
QD=	0.4946E	01	PR=	0.4941E	02	QD=	0.1652E	02	PR= 0.8895E 01
QD=	0.5456E	01	PR=	0.4860E	02	QD=	0.1692E	02	PR= 0.8675E 01
QD=	0.6918E	01	PR=	0.4787E	02	QD=	0.1752E	02	PR= 0.8453E 01
QD=	0.6342E	01	PR=	0.4720E	02	QD=	0.1862E	02	PR= 0.8234E 01
QD=	0.6734E	01	PR=	0.4658E	02	QD=	0.1071E	02	PR= 0.8017E 01
QD=	0.7105E	01	PR=	0.4600E	02	QD=	0.1681E	02	PR= 0.7802E 01
QD=	0.7453E	01	PR=	0.4545E	02	QD=	0.1091E	02	PR= 0.7587E 01
QD=	0.7782E	01	PR=	0.4492E	02	QD=	0.1700E	02	PR= 0.7474E 01
QD=	0.8095E	01	PR=	0.4442E	02	QD=	0.1710E	02	PR= 0.7162E 01
QD=	0.8394E	01	PR=	0.4395E	02	QD=	0.1719E	02	PR= 0.6951E 01
QD=	0.8681E	01	PR=	0.4349E	02	QD=	0.1720E	02	PR= 0.6741E 01
QD=	0.8958E	01	PR=	0.4304E	02	QD=	0.1737E	02	PR= 0.6533E 01
QD=	0.9225E	01	PR=	0.4262E	02	QD=	0.1747E	02	PR= 0.6325E 01
QD=	0.9486E	01	PR=	0.4220E	02	QD=	0.1756E	02	PR= 0.6119E 01
QD=	0.9713E	01	PR=	0.4180E	02	QD=	0.1766E	02	PR= 0.5914E 01
QD=	0.9969E	01	PR=	0.4141E	02	QD=	0.1774E	02	PR= 0.5710E 01
QD=	0.1018E	02	PR=	0.4103E	02	QD=	0.1783E	02	PR= 0.5507E 01
QD=	0.1040E	02	PR=	0.4066E	02	QD=	0.1791E	02	PR= 0.5306E 01
QD=	0.1061E	02	PR=	0.4030E	02	QD=	0.1800E	02	PR= 0.5104E 01
QD=	0.1082E	02	PR=	0.3995E	02	QD=	0.1809E	02	PR= 0.4905E 01
QD=	0.1102E	02	PR=	0.3960E	02	QD=	0.1818E	02	PR= 0.4707E 01
QD=	0.1122E	02	PR=	0.3926E	02	QD=	0.1827E	02	PR= 0.4509E 01
QD=	0.1141E	02	PR=	0.3893E	02	QD=	0.1836E	02	PR= 0.4312E 01
QD=	0.1159E	02	PR=	0.3860E	02	QD=	0.1843E	02	PR= 0.4116E 01
QD=	0.1177E	02	PR=	0.3828E	02	QD=	0.1852E	02	PR= 0.3922E 01
QD=	0.1195E	02	PR=	0.3797E	02	QD=	0.1860E	02	PR= 0.3728E 01
QD=	0.1212E	02	PR=	0.3766E	02	QD=	0.1869E	02	PR= 0.3535E 01
QD=	0.1229E	02	PR=	0.3736E	02	QD=	0.1877E	02	PR= 0.3343E 01
QD=	0.1245E	02	PR=	0.3706E	02	QD=	0.1886E	02	PR= 0.3152E 01
QD=	0.1261E	02	PR=	0.3676E	02	QD=	0.1893E	02	PR= 0.2961E 01
QD=	0.1276E	02	PR=	0.3647E	02	QD=	0.1901E	02	PR= 0.2772E 01
QD=	0.1291E	02	PR=	0.3618E	02	QD=	0.1909E	02	PR= 0.2583E 01
QD=	0.1306E	02	PR=	0.3590E	02	QD=	0.1916E	02	PR= 0.2396E 01
QD=	0.1320E	02	PR=	0.3562E	02	QD=	0.1926E	02	PR= 0.2209E 01
QD=	0.1334E	02	PR=	0.3534E	02	QD=	0.1933E	02	PR= 0.2025E 01
QD=	0.1348E	02	PR=	0.3507E	02	QD=	0.1941E	02	PR= 0.1857E 01
QD=	0.1361E	02	PR=	0.3480E	02	QD=	0.1949E	02	PR= 0.1653E 01
QD=	0.1375E	02	PR=	0.3453E	02	QD=	0.1957E	02	PR= 0.1469E 01
QD=	0.1387E	02	PR=	0.3426E	02	QD=	0.1965E	02	PR= 0.1286E 01
QD=	0.1401E	02	PR=	0.3399E	02	QD=	0.1972E	02	PR= 0.1104E 01
QD=	0.1415E	02	PR=	0.3367E	04	QD=	0.1980E	02	PR= 0.9243E 00
QD=	0.1427E	02	PR=	0.3342E	02	QD=	0.1988E	02	PR= 0.7434E 00
QD=	0.1438E	02	PR=	0.3314E	02	QD=	0.1996E	02	PR= 0.5614E 00
QD=	0.1450E	02	PR=	0.3291E	02	QD=	0.2003E	02	PR= 0.3824E 00
QD=	0.1461E	02	PR=	0.3266E	02	QD=	0.2011E	02	PR= 0.2034E 00
QD=	0.1473E	02	PR=	0.3241E	02	QD=	0.2018E	02	PR= 0.2508E-01
QD=	0.1484E	02	PR=	0.3216E	02				
QD=	0.1495E	02	PR=	0.3192E	02				
QD=	0.1506E	02	PR=	0.3167E	02				
QD=	0.1517E	02	PR=	0.3143E	02				
QD=	0.1528E	02	PR=	0.3119E	02				
QD=	0.1539E	02	PR=	0.3096E	02				
QD=	0.1550E	02	PR=	0.3072E	02				
QD=	0.1560E	02	PR=	0.3049E	02				
QD=	0.1571E	02	PR=	0.3025E	02				
QD=	0.1581E	02	PR=	0.3002E	02				

JL = 7 KL = 60
JU = 8 KU = 67

REAL INCOME CONSTANT SERVICES DEMAND CURVE PASSING THROUGH THE NOMINAL INCOME CONSTANT DEMAND CURVE AT THE SUBSIDIZED PRICE OF 0.1900E 02 DOLLARS.

REAL INCOME CONSTANT SERVICES DEMAND CURVE PASSING THROUGH THE NOMINAL INCOME CONSTANT DEMAND CURVE AT THE SUBSIDIZED PRICE OF 0.2000E 02 DOLLARS.

TABLE OF STATISTICS RELATING TO SERVICE DEMAND AND CONSUMER SURPLUS/REAL INCOME TRANSFERS

INCOME ELASTICITY OF SERVICE DEMAND FOR HOUSEHOLDS WITH AN INCOME OF 11750. DOLLARS IN THE INCOME INTERVAL NUMBER 6.

0.2107E 01

PRICE ELASTICITY OF SERVICE DEMAND AT PRICE POINT P=SUM ON THE NOMINAL INCOME CONSTANT DEMAND FUNCTION

+0.4671E 00

PRICE ELASTICITY OF SERVICE DEMAND AT PRICE POINT P=SUB ON THE REAL INCOME CONSTANT DEMAND FUNCTION

+0.4269E 00

THE SUBSCRIPTION PRICE (P=MON) AT WHICH THE HOUSEHOLD JUST ENTERS THE MARKET TO PURCHASE SOME OF THE SERVICE

17.0000

THE HOUSEHOLDS PRICE (P=MON) AT WHICH THE HOUSEHOLD BUYS A QUANTITY OF 0.1079E 02 UNITS OF THE SERVICE

20.7000

THE SUBSIDIZED PRICE (P=SUB) AT WHICH THE HOUSEHOLD BUYS A QUANTITY OF 0.1900E 02 UNITS OF THE SERVICE

19.0000

THE REAL INCOME TRANSFER IN GOING FROM NO SERVICES TO PROVIDING SERVICES AT A PRICE OF 0.2000E 02 DOLLARS/MONTH

249.3704

THE REAL INCOME TRANSFER IN GOING FROM NO SERVICES TO PROVIDING SERVICES AT A PRICE OF 0.2000E 02 DOLLARS/MONTH

117.1179

THE REAL INCOME TRANSFER IN GOING FROM PROVIDING SERVICES AT PRICE B 0.2000E 02 (P=MON) TO PRICE B 0.1900E 02 (P=SUB)

70.2995

QUANTITY CONSTRAINED INCOME TRANSFER MEASURE IN GOING FROM A PRICE A 0.1900E 02 (P=SUB) TO PRICE B 0.2030E 02 (P=MON)

89.0898

DIAGRAM G

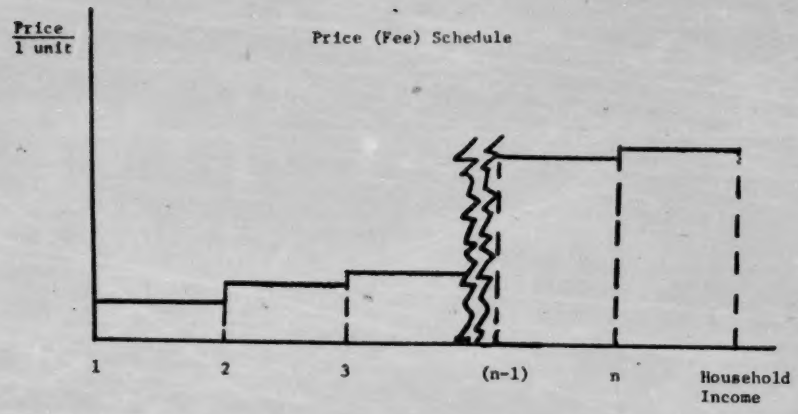


DIAGRAM H

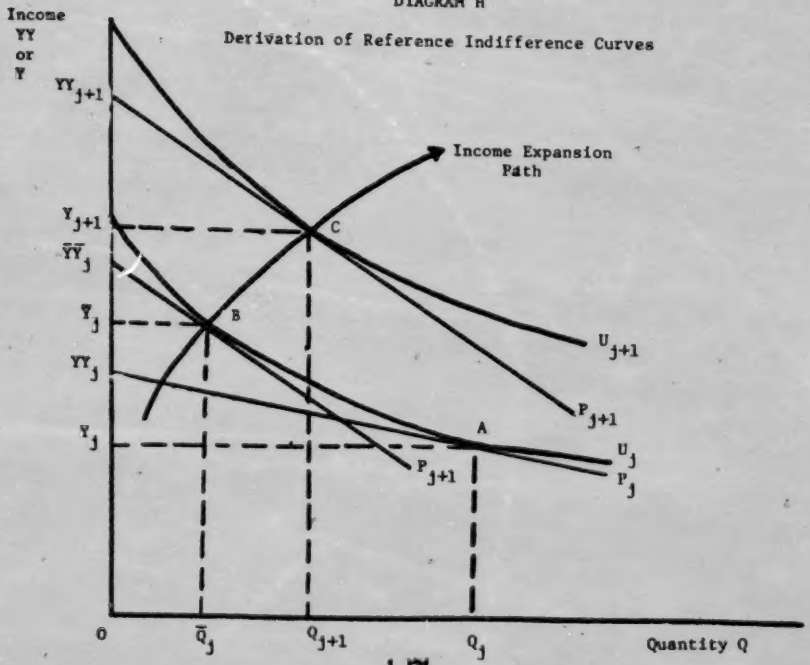


DIAGRAM I

Interpolation of Indifference Curves

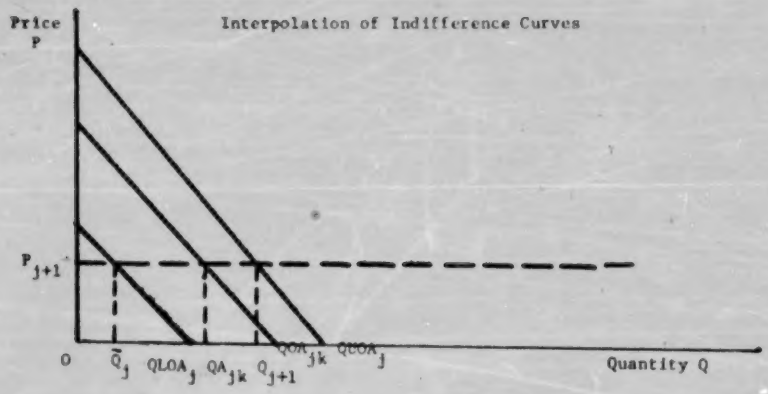


DIAGRAM J

Interpolation of Indifference Curves

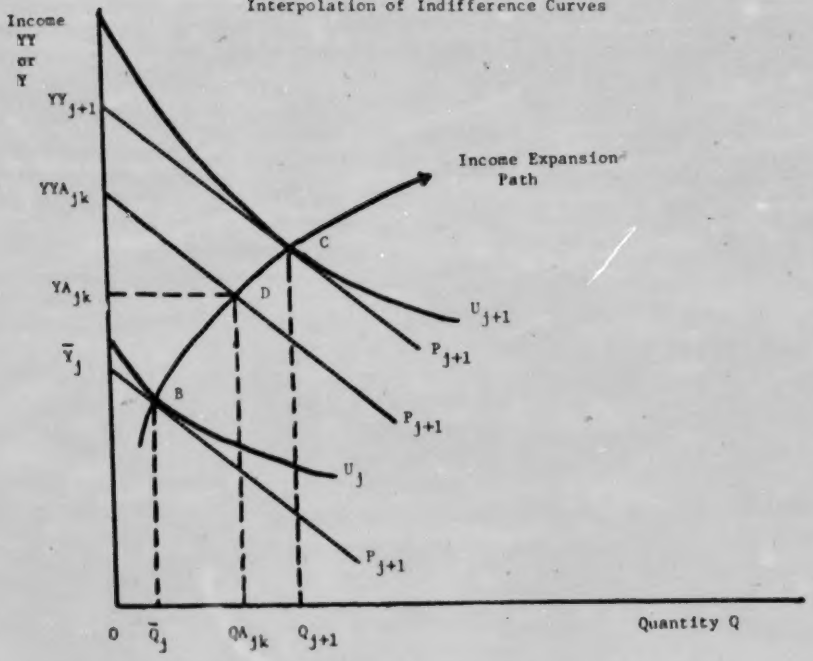


DIAGRAM K

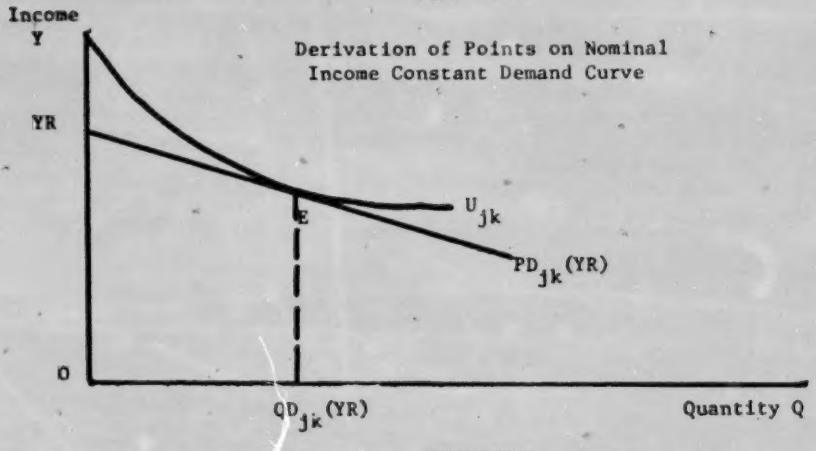


DIAGRAM L

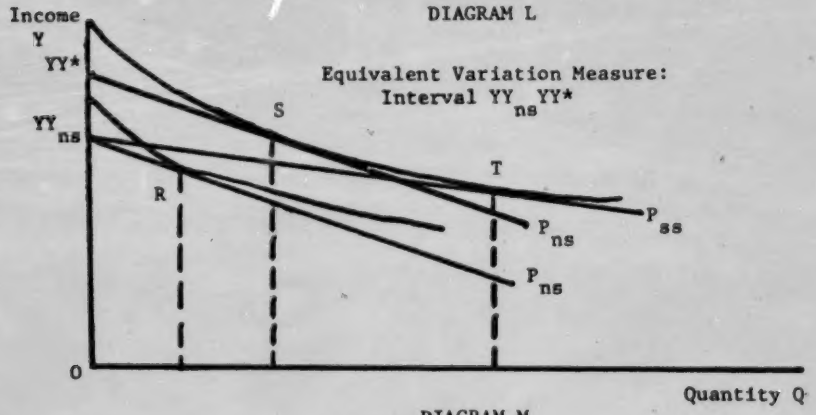
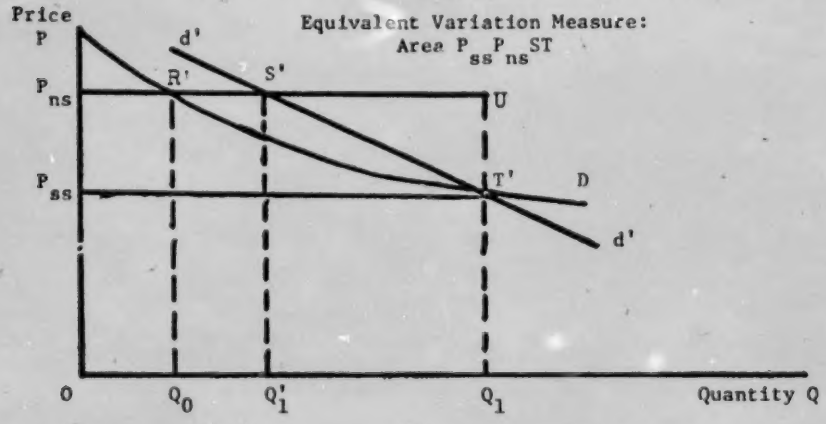


DIAGRAM M



LINKAGES IN A COMMUNITY SERVICES DELIVERY SYSTEM MODEL

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In any community services delivery system there is a variety of interrelationships that exists which is necessary and vital to the functioning of the system. These interrelationships and connections between units of the delivery system are defined as linkages. This paper will deal briefly with the total linkages model and more specifically with one set of linkages, namely those between service delivery organizations.

In the community services delivery system model that we are using as the theoretical framework for this portion of the NE-77 study there are a number of components. First, any services delivery system must be designed to serve some geographical location. Since the delivery system is located in space there will be certain governmental structures (and those structures' regulations and prescriptions) which will affect the operation of the system. In the model to be used here the local governmental unit is designated as the control strueture. The local control structure varies from state to state in the Northeast, from the town in New England, township and county combinations in the Middle Atlantic States, to the county in Maryland and West Virginia. These local control units are most responsible for the delivery of services in the areas they govern.

However, the local control unit does not exist in a vacuum, nor is it the only level of government which is involved in services delivery. The state government, through various means, such as funding and legal requirements, also plays a role in the functioning of the total system. Moving one step higher on the governmental ladder, the Federal Government also has an effect on the delivery of services, and in fact directly administers several programs. Due to the federal nature of our government there are three levels of government, local, state and national, all of which are components in the community services delivery system model.

Within the control unit area there exist a number of organizations and agencies, both public and private, with paid and volunteer staff, which actually deliver the services to the citizens of the area. The number and size of these delivery organizations vary from state to state and local control unit to local control unit throughout the region. The services delivered by various organizations also vary within service delivery systems. These service organizations as components in the model are linked to both the governmental units and the client organizations which utilize the services.

The inhabitants who use the services are designated as clients in the model and are components in the system either as individuals, organizations or as categorical groups. The most obvious and important client organization is the family. The clients are linked to the service organizations in a variety of ways, as well as to the governmental structures. These linkages will be discussed below.

A final component in the model is the culture of the control unit area. The culture, through norms, values, and institutions, will define and prescribe many

of the relationships or linkages between the various components in the system. In examining the functioning of the delivery system it is necessary to note the effect of the culture on this functioning. Culture must be seen as an all-pervading force which is ever present in the delivery of services.

Having listed the components of the services delivery system model, the interrelationships and connections, i.e., linkages, between them can be examined. In the model all possible linkages will be advanced. Empirical analysis of particular delivery systems may find that certain linkages seem to be absent or underdeveloped. Relative strength and formalization of these linkages are two variables to observe when looking at a delivery system.

Between the local control unit and the state and federal governments there is a complex of two-way linkages. The local unit is linked to the state and federal government through funding and legal requirements concerning service delivery. The state and federal governments are linked to the local government in a variety of additional ways throughout the region. The forms of these linkages between levels of government are in themselves a linkage variable. There are linkages between the state and federal governments which generally are also of a fiscal and legal nature, and change periodically. Of course all levels of government operate within the context of U.S. culture and are influenced by it through particular norms, values and institutions which define how the three levels will interact with one another.

The service organizations are linked to the state, local and federal governments through funding and legal requirements. This is particularly true of public organizations and agencies, but most privately provided services are also linked to the governmental structures, if only on a limited basis. Another important set of linkages, and an area to be discussed in more detail below, are those between service delivery organizations. These horizontal linkages between service organizations will vary due to a number of factors and have been the focus of considerable research. Interorganizational relations are important in understanding the functioning of the delivery system in that they are an indication of the relative integration of the provider side of the equation. The service delivery organizations are linked to the clients through use and contact, and the services provided by this linkage are the purpose of the whole system. An understanding of the various aspects of the linkages between the client and the service delivery organizations is vital to understanding the entire system. These linkages are also affected by the cultural milieu in which they are established, and these effects must be considered.

The clients and client organizations are linked to the governmental levels through voting, taxes and legal prescriptions, to mention the major generalized linkages. The strength of these linkages most likely will partially determine the efficiency of the system. If client input into the political system is weak it will be hard to bring about change. However, if the client organizations are vocal participants in the political process, probably change in the delivery system will be easier to effect. Likewise linkages between client groupings and the service delivery organizations and agencies will vary in strength. If client participation in organizational operations is one of the existing linkages then the system can be changed more readily, but if the clients are merely users of service, their ability to effect change will be greatly reduced. Interclient linkages are also an important factor to keep in mind when examining the system. Here again the culture in which the clients live will affect the forms and nature of the linkages that

exist with the governmental levels and the service organizations.

Throughout the above discussion various assumptions have been made. One is that in the model, service delivery organizations will be the unit of analysis. This is not meant to ignore the importance of intraorganizational linkages, and it is apparent that the internal workings and organization of an agency will greatly determine how that agency functions. But for the purpose of this model the service delivery organization is seen as the basic unit, since it is the provider of the service. Likewise, governmental units as a whole are used in the model, rather than individuals; and intragovernmental linkages and relations are also important factors in the function of the delivery system. It is also assumed that the purpose of a community service delivery system is in fact the provision of services to clients and is the focal point of the model. Other types of linkages in the system are ultimately evaluated in terms of the set of linkages between clients and service delivery organizations. The community services delivery system model is diagrammatically presented in Figure 1.

Interorganizational Linkage as a Focus of Study

Interorganizational linkage has been defined by Hasenfeld and English as "...the variety of interactions between two or more organizations designed to enhance organizational goals." In dealing with community service delivery organizations it is assumed that one of the goals of all the organizations in the system is the provision of services to clients. Since the general purpose of the entire system is the provision of services to clients, investigation of the interorganizational relationships designed to enhance delivery of services is valuable and is the rationale for using interorganizational linkage as a major focus of the research.

Various approaches have been suggested in the literature as to how to best analyze these linkages. Marrett, in her review of the literature, suggests that five major approaches have been followed in previous research [1]. These five approaches are: 1) Intraorganizational properties, such as complexity, innovativeness, openness of communication, access to outside resources, and autonomy from parent body, 2) Comparative properties, such as similarity of goals, complementarity of resources, compatibility of philosophies, and similarity of structures, 3) Relational properties, such as formality, embeddedness, intensity, reciprocity and cooperativeness, 4) Formal contextual properties, such as extralocal integration, local integration, size of organizational set, and history of interlocking relations, and 5) nonorganized contextual properties, such as demographic structure, economic conditons, concentration of resources and community support. In addition to the five approaches Marrett points out, Hasenfeld and English look at the body of research in a slightly different way [2]. They see the three ways of investigating interorganizational relations as 1) looking at the relations between an entire network of organizations 2) looking at the interactions between a pair of organizations in a network, and 3) looking at the forms of linkages organizations use to relate to other organizations. In other words, focus can be on the system as a whole, on a subset of the system, or on the formal aspects of the linkages themselves. It is hoped that in an investigation into the interorganizational linkages in the community services delivery system that elements of a variety of these approaches could be employed.

One alternative synthesis is to view several of the variables of the first, fourth and fifth approach delineated by Marrett as independent variables and examine

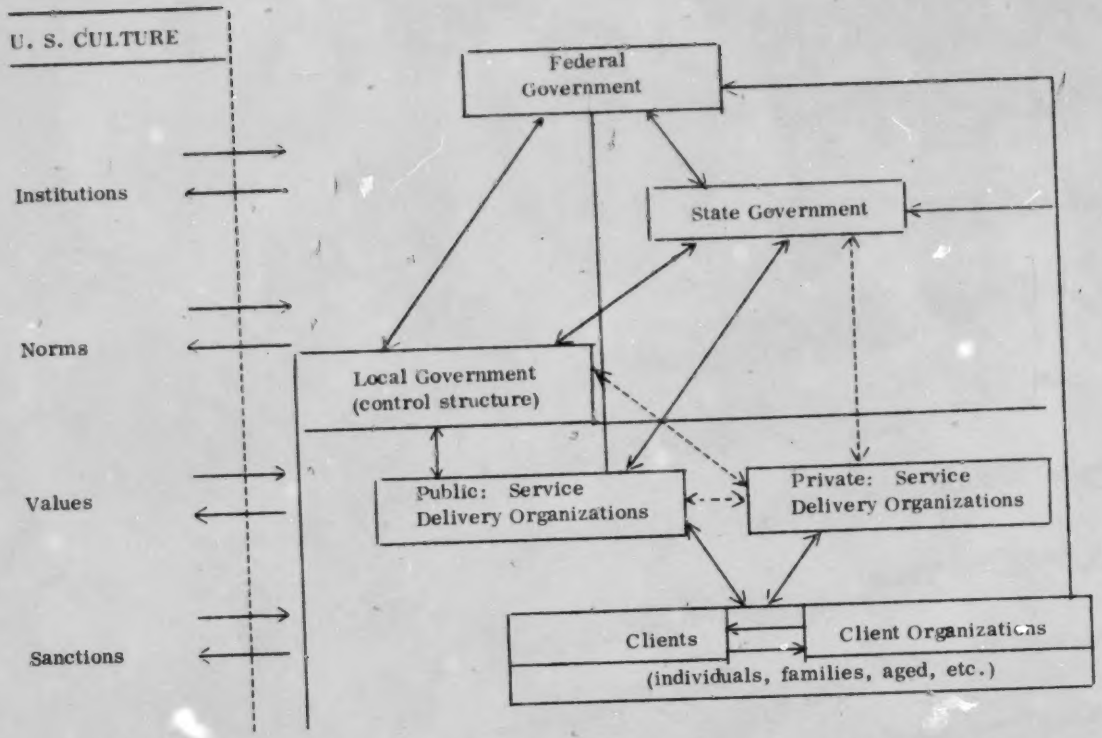

Figure 1. Community services delivery system model

their effect on variables from the other three approaches. In any one delivery system certain nonorganized contextual properties are more or less given and can be viewed as independent variables, e.g., demographic structure, concentration of resources, etc. The intraorganizational property of complexity can also be viewed as an independent variable as it will affect relational properties. From the formal contextual properties approach the size of the organizational set is seen as an important independent variable which will influence the forms, variety and intensity of relations between organizations.

Some dependent variables, mainly from the relational properties approach, which seem worthy of investigation are: frequency and interaction and number of agencies a referrant agency deals with as indicators of intensity, reciprocity of interaction, variety of programs and types of communication, as well as variety of forms that interorganizational linkage takes. These variables are referred to as dimensions of exchange in White and Levine's work on interorganizational exchange among health organizations [3]. It is felt that this synthesis combines the elements of the five approaches Marrett outlines, as well as looking at the entire service delivery network, and the forms of linkage as suggested by Hasenfeld and English.

By looking at the pattern of interorganizational linkages in a given service delivery system it is hoped that a better understanding of the functioning of that system is gained. After this pattern is outlined and the relationships among service delivery organizations are defined, then the effectiveness of these linkages in enhancing service delivery can be gauged by comparing client responses on service use to some index of interorganizational linkage. It could be hypothesized that those organizations with higher linkage indexes would provide better service delivery. Interorganizational linkage is seen as one of the major factors involved in service delivery and therefore an important preliminary focus of study.

In conclusion, in order to understand the functioning of a community services delivery system it is necessary to have some comprehension of the linkages which are operating in that system. To know the components is not enough. The interaction among the various components adds life and meaning to the system.

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VOLUNTARISM AND RURAL COMMUNITY SERVICES[1]

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Voluntarism plays an important role in the delivery of many community services.[2] Americans have long volunteered their time to produce services of both a public and a private nature. Some aspects of voluntarism are readily recognized in our society—for example, most people have heard of the Peace Corps or VISTA. There is, however, a quite general tendency on the part of the public to recognize the more social welfare-oriented types of voluntarism, but to grossly underestimate its many other facets. This is particularly true of many of the services often provided in whole or in part by local volunteer action, which in the absence of such inputs would have to be financed by the various local governments through the use of taxes or fees.

The contribution volunteers make to our level of living is not small. Serageldin estimated for 1964 that the 60 million U.S. families each contributed volunteer work with an average value of $204 annually to the economy [15, pp. 77, 121]. Consider the case of just one service, fire protection. The President's National Commission on Fire Prevention and Control estimated that about one

[1]In this section the economic aspects of voluntarism are emphasized. This is not to deny the importance of sociological, psychological, and other factors as determinants of voluntary action. These have received some attention in the literature, but the economic factors have received only limited notice. An attempt is made to help rectify the situation in this section.

[2]Voluntarism refers to those kinds of human activity that are performed primarily for reasons other than (a) the expectation of direct remuneration (b) the coercion of law, custom, physical force, economic threats, or other sociopolitical force, or (c) the compulsion of physiological needs [16, p. 1]. Partial, subsistance remuneration or reimbursement for expenses incurred by the volunteers may be involved.

million people serve as volunteer firemen—five times the number of paid firefighters—and they cite one estimate that the Nation's volunteer firemen are rendering a public service worth at least $4.5 billion annually, based on what it would cost to replace them with paid firemen [1, pp. 18-19]. Moreover, the importance of voluntarism apparently has been increasing rapidly due to factors such as shorter workweeks, earlier retirement, and rising incomes. One recent report in the press estimated that there were at least seven million voluntary groups in the United States involving up to 70 million members and creating a gross product worth perhaps $50 billion annually [21, p. 29].

It thus appears evident that any reduction in the amount of labor supplied by volunteers would produce substantial changes in the quality of life available to some segments of society. While all people would be affected by change in the amount of labor volunteered, since everyone consumes some services produced using voluntary labor, those living in smaller, more rural communities are likely to feel the impact of any change most strongly. Most public services produced in these communities rely on the use of some volunteer labor, so all residents will be faced with a tax increase if it becomes necessary to pay the market price for work formerly volunteered. Using fire protection as the most obvious example, it is highly unlikely that most small communities can afford to support a fully paid fire department of adequate size. Thus, it appears that voluntarism merits the attention of those interested in rural development.

Voluntarism and the Social Sciences

Any systematic analysis of the voluntarism phenomenon is in large part dependent upon the development of a theoretical framework which includes time and helps explain why people use time in various ways under different circumstances. Unfortunately, although social scientists have shown some interest regarding time as a research subject in the past, no concerted attack on the problem has been made until quite recently [9, p. 6]. This has meant that the general public has not been alone in underestimating the magnitude of voluntarism. Social scientists also have been somewhat remiss.

What studies social scientists have conducted involving time have varied a great deal in approach.[3] Social anthropologists have attempted to describe attitudes toward time in a number of different cultures. Sociologists have made significant efforts to conduct large time-budget studies. They also have been active in the field of gerontological research, and it is here in trying to find ways to help the elderly productively use their time that social scientists have come about as close to dealing with some of the questions relating to voluntarism as anywhere in recent years [13, 19]. Moreover, sociologists have looked at the role voluntary organizations play in community structure [24].

One would think the study of economics as a science devoted to the principles of allocating scarce resources would have naturally led to a concern among its students about how society could better economize on the usage of time as a scarce commodity. Such was not the case, however, as a reasonable analysis of time was lacking from the economics literature until fairly recently. It is widely accepted that Becker's work published in 1965 was the first to successfully incorporate a general theory of time allocation into an economics framework [2].

[3]For a more detailed discussion of this point, see [9].

Linder also was working on an economic theory of time allocation during the 1960s which reached conclusions similar to those of Becker, but Linder's book was not published until 1970 [9]. The result of this work has been a much increased interest in time among economists. For example, Linder's book subsequently stimulated an impressive symposium on "Time in Economic Life" [18].

Becker's work on time rests on the earlier theoretical developments regarding human capital. This is the concept that investments in human capital are made according to a conscious plan which creates productive stocks, embodied in human beings, that provide services through future years. Such services are composed of producer services shown by future earnings and consumer services that accrue to the individual as future satisfactions. Becker notes that the economic development resulting from investment in both human and nonhuman capital has led to a secular decline in the length of the workweek [2, p. 513]. Economic growth due to increased productivity has caused the value of human time and hence labor intensive activities to increase relative to that of materials that are not labor intensive. As a result, the allocation and efficiency of nonworking time may now be more important to economic welfare than that of working time. Becker thus developed an economic framework which treats human time in allocative decisions with respect to both market and nonmarket activities.

It did not take economists long to realize that the new concept of human time is not limited to work in the labor market, but also is applicable to work in the household [14, p. S5-S6]. Indeed, Becker mentioned this in his pioneering article but did not pursue it to any degree [2, p. 512]. Traditional economic theory has been criticized for neglecting the behavior of families [5]. By focusing on time as a factor of production and consumption, the new Becker framework makes the allocation of time a new and prime economic issue. This has given rise to what is termed the "new theory of consumption" or "the new economics of the family (or household)" [7, 10, 14]. Under this theory the allocation of time between market and nonmarket activities is developed, within the context of the family, as a matter of interdependence with needs and characteristics of the other family members. The family is assumed to maximize utility by allocating its time in the production of market and home goods subject to its production function, limited time of each member, their wage functions, and other variables.

A related development has been the increased interest among economists concerning the economic role of women, which reflects changing values of the society as a whole [3, 5, 7, 20]. It is true that this is in some ways a subset of the new economics of the family, but it has some other dimensions. No longer are economists simply interested in such questions as the earnings differentials between women and men. Now they also are interested in such problems as how women allocate time, the value of women's "nonwork" activity, and the contribution housewives make to the gross national product. However, one soon learns that traditional or short-cut economic tools cannot always deal effectively with such problems.

Consider, for example, the problem of the value of housewives' services. This question has helped revive an interest in time-use budget research. Thus, some of the more recent thrusts in the time-use area have been efforts to establish a dollar value for household work [6, 22, 23]. It is interesting to note that Becker

in his pioneering article mentions information on the "expenditure of time" and "time budgets" as the tools with which one can obtain a better reading on the size and allocation of full income [2, p. 517].

Thus, to summarize, one must conclude that recent changes in the social sciences—economics in particular—have done much to facilitate the study of voluntarism. Indeed, when one considers the four major interrelated developments of particular relevance, i.e. (1) the new economic theory of time, (2) the new theory of the household, (3) the increased interest in the economic status of women (housewives in particular), and (4) the renewed stress on time-use budget analysis, it seems as if the existence and importance of volunteer labor cannot be ignored.

Voluntarism and Revenue Sharing: A Special Policy Issue

The use of volunteers by local governments has a number of implications for national policy. Here, one of special interest—revenue sharing—is examined.

It is widely recognized by students of public finance that the use of fees by lower levels of government can distort the equity of distribution of any revenue-sharing funds which are passed down by higher levels of government on the basis of distribution formulas tied wholly or in part to relative tax effort of the various local governments. The present system of Federal revenue sharing contains this bias. To the extent that a community relies upon fees, it is penalized. However, some feel that this inequity will tend to disappear through time if revenue sharing is continued, because communities will tend to change from a fee to a tax basis for more governmental services.

However, there is another inequity in the present system of revenue sharing, which not only is important but quite subtle. It leads one to be concerned with both the equity of the current allocation program and its efficiency. Specifically, it is hypothesized that because no adjustment is made for the use of volunteer labor, allocation formulas which include a measure of relative tax effort discriminate against communities using volunteer labor and in favor of those using paid inputs. If the ratio of volunteer to paid labor varies in any systematic way, either across governments or across services, the allocation program will be neither equitable nor efficient. The possible existence of this bias is also noted by Hitzhusen who states that "it would appear that volunteerism in government (particularly in fire protection) is predominantly a phenomenon of small rather than large communities" [8, p. 10].

Under present law Federal revenue-sharing funds are apportioned in the following manner. First, the national fund is allocated among the States according to either a three- or a five-factor formula with each State allowed to choose the formula most advantageous to it. Under the three-factor formula, a State's share depends on its population, relative income per capita, and relative tax effort. The five-factor formula adds the State's urban population and relative State income tax collections to the three factors above. One-third of each State's allocation is then retained by the State with two-thirds passing through to local governments. The local unit's share is determined by another three-factor formula based on population, relative income per capita, and general tax effort.

The current allocation procedure fails to take into account the cost of inputs which are not purchased with tax revenues. The most important of these neg-

lected costs is the opportunity cost of vulunteer labor. Because of this, it is suspected that communities and services making use of volunteers are discriminated against. For example, consider two communities identical in all respects except that fire protection in one community is provided by a paid professional department supported by tax revenue, while fire protection of an identical quality is produced in the second community by a completely volunteer department. Under the present formula, the first community would receive a larger revenue-sharing allotment because its tax effort would be higher. By ignoring the opportunity cost of volunteer time, a situation is created in which the residents of two identical communities are treated differently, and in which economic incentives are created to shift production techniques to those using paid labor and to migrate to the community using paid labor.

Similar incentives and disincentives exist both across services and in the choice of production techniques. When funds are distributed on the basis of a formula which includes tax effort, one actually has a program which subsidizes the production of those services which require purchased labor and capital. Programs utilizing volunteer labor become relatively more expensive in the eyes of the public and less of these services are produced. Similarly, the public has an incentive to shift from a production technique requiring volunteers to one utilizing paid labor. This may actually lead to a net welfare loss for society as a whole. In all these instances the size of the loss or bias is an empirical question of considerable importance.

The model of individual behavior sketched in the next section provides some assistance in setting an upper bound on the opportunity cost of volunteer labor.[4] It does not, however, allow us to make any final judgments about the importance or lack of importance of this bias. The first-order conditions indicate that an individual will not volunteer unless the marginal utility of his expected tax reduction is equal to or greater than the marginal utility of the leisure given up. In the example of the two identical communities, the opportunity cost of the volunteer labor used can never exceed the amount of taxes that would be paid by the volunteers if the service was provided by paid professionals. The empirical question of comparing the opportunity cost of the volunteer time in one city with the tax revenues required elsewhere to produce the service still remains, however.

Since extension of the Federal revenue sharing program beyond 1976 must be regarded as a near certainty, and since such an extension is likely to involve an increase in funds, a study of differences in the use of voluntary labor by city size and region appears to be of high priority. It seems important to know the size of the biases and disincentives in the present program before they are made permanent.

Perhaps some skeptics might regard the entire voluntarism and revenue sharing issue as a moot point since any real world adjustment would seem to be complex. However, it seems one should recognize the imperfections in the present system, and, as Hitzhusen notes, "...in the case of fire protection, the American Insurance Association currently utilizes a conversion factor of four volunteers equal to one paid fireman in grading a community fire department and establishing a base fire insurance rate" [8, p. 11]. He also notes that similar techniques might be used in determining the "tax effort equivalent" of volun-

[4]For greater detail regarding the model, see [17].

teer as opposed to paid firemen [8, p. 11]. With improved voluntarism data, approaches possibly could be developed which would allow one to estimate the "tax effort equivalent" of the volunteers providing other local governmental services.

Voluntarism and Economic Man

It has been shown that voluntarism plays an important role in providing rural community services and that it has important policy ramifications. But what about the motivations of the people involved? Who volunteers and for what reasons? The limited attention to date focused on these important questions by social scientists has tended to be cast in a sociological framework [11,1]. This work has elucidated a wide range of factors—from personality traits to health—which have a bearing on the rate of voluntarism. Such factors are relevant, but one could overlook some basic economic forces which might be operating. In other words, does economics have anything to say about the motivations of the individual volunteer? Or does the alleged predominance of altruistic motives by the individual volunteer render the theories of economics presenting man as a "hedonistic calculator" inoperative? Thus, let's consider the question of the individual in some detail.

When economists study the allocation of time, they rely on the same theoretical constructs they use in more traditional studies. The only major difference in the behavioral model assumed is that utility is maximized subject to a constraint on time rather than one on income. With this model it can be shown that each consumer benefits most when the marginal utility associated with the last unit of his time used in leisure is equated to the marginal utility derived from the income obtained from the last unit of his time spent at work. If the model is extended to include volunteer work, a similar condition must be met. The marginal utility associated with the last unit of time spent in volunteer work, the marginal utility of the income derived from the last unit of time spent at work, and the marginal utility of the last unit of leisure time must all be equal for the consumer to be at his optimal position.[5]

The concepts of marginal utility of income and leisure are basic to ecnomics and require no further elaboration. The sources of utility consumers derive from volunteer time are less obvious, however, and a better understanding of them will provide some insights into the questions of who volunteers and why.

Individuals who volunteer derive satisfaction from two sources. First, there is the direct satisfaction (consumption component) associated with the act of volunteering and with the results of one's efforts. This is an important element of the utility derived from voluntarism and it is what usually comes to mind as the reason individuals volunteer. It includes satisfaction derived from volunteering for reasons which can be categorized as social, cultural, hobby, status, sense of duty, etc. Unfortunately, though, this satisfaction is not easily measured, and we do not know enough about systematic variations in the amount of satisfaction individuals receive that we can base predictions about the future supply of volunteer labor on anything other than assumptions. The amount of personal satisfaction one receives from a volunteer activity is an individual matter, and without information about a systematic relationship between the level of this satisfaction and socioeconomic variables little can be said.

[5]A more rigorous discussion of this model is contained in [17].

Secondly, volunteer work produces utility indirectly. When one volunteers his labor the price he pays to obtain the service is reduced, thus freeing earned income to be spent elsewhere. This reduction in the cost of the service to the individual can be thought of as an implicit or shadow wage earned by the volunteer, and for most services this cost reduction is made up primarily of tax savings.[6] For many services provided by volunteers, especially those of a governmental nature, this may be the chief source of utility for the individual, and it is on these services that we focus our attention.

The individual, in calculating his shadow wage, is assumed to consider both his own productivity in the activity and his best estimate of the number and productivity of others who will volunteer. His shadow wage then is the expected reduction in tax payments and other costs associated with the provision of the service which can be directly attributed to his participation. Thus, a particular individual is not likely to volunteer to provide a service if he expects that a sufficient number of others will volunteer or if his productivity is such that the contribution of his time will have no appreciable effect on the cost of the service to him. However, one can also imagine situations where even though an individual's productivity in the task is much lower than a professional's, the shadow wage might be quite high. Such a situation might occur where there is insufficient work to fully utilize a professional staff, but where the costs of doing without the service are great.

By focusing attention on the determinants of the shadow wage and the conditions under which it may change a great deal can be inferred about voluntarism. If we assume the polar case, where no utility is derived from the results of the activity, it can be shown that individuals reach their preferred position by equating the marginal utility of leisure with the marginal utility of income derived from the last unit of time spent either working in the market or as a volunteer. This condition allows further predictions about the effect of increased productivity in either market or volunteer work on the amount of time volunteered by individuals.

Who volunteers is one type of question for which this model provides some answers. By analyzing the determinants of the shadow wage for a particular service the characteristics of groups of individuals having high shadow wages can be identified. Looking at the "who" question with regard to volunteer fire protection, we find that individuals owning significantly more property than others with similar incomes have a potentially high shadow wage. Without a volunteer fire system these citizens would either have to pay more property taxes in order to support a paid fire department or face the probability of a larger than average loss in case of fire. Owners of local businesses and commercial establishments are the most obvious members of this group since they have both their business and their home to protect and pay property taxes on. Casual examination of local volunteer fire department rosters confirms that there is a high degree of participation by members of this group.

When viewed from the consumer side the volunteer question can be treated as a special case of traditional labor supply models with the shadow wage

[6]The term *shadow wage* denotes an "implicit" or "accounting" value to the individual that enters into his decisionmaking process, but it is not actually earned as a wage in the marketplace in the usual sense. Thus, in this case the individual knows that volunteering has made the service in question less expensive to him because his taxes are lower than they otherwise would have been. The net reduction in taxes is his shadow wage.

rather than the market wage being the relevant wage rate for analysis. While only a few of the implications of the analysis have been dealt with here, further examination of the shadow wage rate for volunteer work should improve our understanding of both the who and the why of voluntarism.

Knowledge Gaps

The growing interest in and importance of voluntarism provides a good background for research. There are many areas of this complex subject which have knowledge gaps and need systematic inquiry of both a theoretical and practical nature to provide adequate answers. Some potential areas for productive research have been noted above in passing. These as well as some of the other major areas of interest can be itemized in a nonexhaustive list as follows:

(1) It is evident that the volunteer question has many important dimensions and implications with respect to local governments. More theoretical work is needed, plus the most basic kinds of data. Such data should include as a beginning both the amount of local governmental volunteer inputs both by function and geographical areas. Some point to the substantial volunteer component in New England town government, but without adequate data, one does not know if, for example, it is more important than in the rural South. Regional and rural-urban considerations may be very important. The implications for revenue sharing have been noted.

It is true that to mount a comprehensive survey of voluntarism would require the assistance of a large agency such as the U.S. Bureau of the Census. (The April 1974 Current Population Survey did contain a short questionnaire on volunteer work, but results are not yet available.) But much can be learned on a smaller scale. For instance, regional research plays a role in the land grant-USDA complex. When appropriate surveys are conducted on a regional basis, questions dealing with various aspects on voluntarism could be added. An example of this would be the recent NE-77 survey of community services in the nonmetropolitan Northeast.

(2) More information is needed about who volunteers and for what reasons. Sociologists have made some contributions in this area, but it also has important economic questions as was shown earlier. For example, a particular service could be examined, such as fire departments, to learn more about the shadow wage rate for volunteer work in an effort to know more about both the who and why of voluntarism. Particular case studies might be helpful in this area.

(3) It appears that community size may hold some important implications for the amount and type of voluntary action one observes.[7] Voluntary labor has important considerations for the various public service production coefficients because the amount of such labor is thought to vary greatly by city size. The production decision might be viewed from the community's point of view and from the perspective of the manager of the enterprise (fire control for example). The decision on whether volunteer labor will be used to produce the service is seen as a decision on the technology or production process to be employed. This decision is made by the community. After the community decides whether volunteers will be used, the manager determines the amount of capital and labor to be used. It seems that a particular service, such as fire departments, might be studied in a number of cities of various sizes to learn more concerning the ef-

[7]For greater detail regarding the theoretical implications, see [17, pp. 8-10].

fects community characteristics have on the amount and kind of volunteer work undertaken.

(4) More information is needed on how to facilitate and guide the forces of voluntarism. This goes beyond the "who" and "why" of voluntarism. Volunteers play an important role in the complex community development process [4]. They can act as encouragers (or discouragers) to this process. Extension and other similar personnel have the important task of guiding the volunteers they influence to become encouragers. This is a complex art which can be improved. Certainly, the social sciences have much to offer here. For instance, much could be gained if social scientists better understood the factors motivating volunteers. This is not an easy task and will require input from a number of the social sciences.

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MIX OF SERVICES AT THE COMMUNITY LEVEL

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"Mix" of services at the local community level can have different reference points. One way to view mix is in terms of service array, magnitude and distribution. This paper will review some of these concepts and outline some hypotheses about mix as a dependent and an independent variable.

Service Array

Array of services in a community refers to the services that are available in a community. Array is an important factor in service delivery for a community. As Cordes et al. state in their paper in this monograph, "more services are preferred to fewer services."[1]

Development of an array of services in a community varies depending upon the types of services one wants to include. One way of classifying services is in terms of the following:

A. Human—to include welfare, health, legal and to some extent educational
B. Retail trade—to include retail stores of various types

[1]This statement of course does not hold for all communities nor for all groups or individuals within communities. Some may prefer fewer to more services.

C. Personal—to include shoe repair, barbershops, and the like
D. Environmental—to include water supply, sewage disposal, solid waste disposal, and air pollution control
E. Exchange—to include communication and transportation
F. Protection—to include fire and police
G. Coordinating—to include planning councils, information and referral services, and the like.

Thus, there are a number of services which could be included in an array.[2]

A problem encountered in developing an array of services is that of distinguishing the provider of the service from the service offered. Frequently the two are used interchangeably in the compilation of community service arrays. To help alleviate this problem the term ***structure*** or ***organization*** can be used to refer to provider, and ***function*** or ***activity*** to refer to service. The Salvation Army is classified as a provider organization, with flood or fire disaster aid being a service of this provider. A hospital is listed as a provider with surgical and obstetrical-maternity being two services that could be provided.

Service Magnitude

Magnitude of a service can be measured in different ways. One rather "obvious" measure is the annual budget of the agency. An example of a testable hypothesis is: the larger the budget, the larger the total service output. A measurement problem on the input side of this relationship is the undercounting of volunteer work. This is especially problematical for human service agencies. Some provider agencies use a large proportion of volunteer hours in delivering a service, whereas others use few, if any, hours of volunteer time. To obtain an accurate measure of resources "budgeted" or "used" in providing a service, consideration of volunteer inputs is necessary.

A second measure of magnitude would be the number of clients served. It could be asserted that the larger the number of clients served, the larger the agency. A limitation of this approach is the difference in degree to which clients are served. Some agencies, mental health for example, may require more intensive work with clients than other agencies such as an employment agency. Also some agencies may work with clients in a more complete manner while others do this superficially.

A significant problem in measuring magnitude of a service, regardless of the unit by which magnitude is measured, is that of allocating magnitude among services in a multiservice agency. For example, if it is decided to compare magnitude of special education services among communities, one needs to measure magnitude of this service in isolation from other services which the particular provider (school system) may offer. This means finding methods by which the various resources being used to measure magnitude can be divided up among "service functions" of the agency.

[2]After much discussion, the NE-77 technical committee decided whether or not ten major categories of services existed in the sites selected across the ten-state region. That is, it was decided to define array in terms of these ten major categories of services: (1) personal health, (2) welfare and income supplements, (3) education, (4) environmental health, (5) manpower development and training, (6) housing, (7) legal services, (8) recreation and cultural affairs, (9) planning agencies for human services, and (10) transportation. A detailed list of the more specific services for which existence-nonexistence was determined is given in Appendix A. As time passed, the phrase "provider inventory" came to be substituted for "array."

Distribution of Service

Distribution, the third dimension of mix, refers to who in the community receives a particular service. Distribution is related to but does not completely answer the question of equity. In pursuing the question of distribution, the researcher might pursue it from the standpoint of geography, socioeconomic characteristics of clients, or distribution relative to some characteristics of the provider.

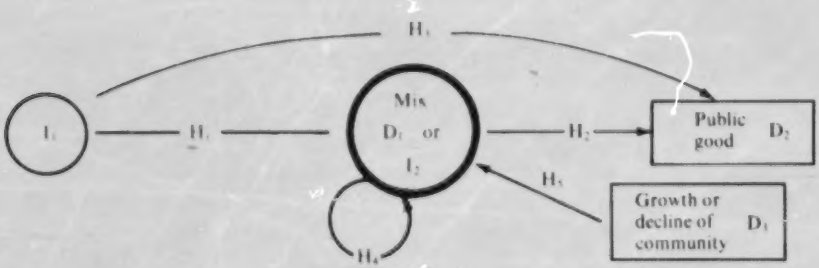
Factors Affecting Mix

The array, magnitude, and distribution of services in a community can be affected by forces external to the community as well as forces internal to the community. State and federal regulations regarding mandating of particular services are external forces affecting mix. Likewise, the amount and type of state and/or federal funding can affect mix. It seems reasonable to hypothesize that the larger the amount of state or federal funding for a particular service, or the more favorable the matching ratio of funding for the service, the more likely it is that that service will be in a local community's array when compared to inclusion of services not under federal or state mandate or special funding.

Within a community, ecological, demographic, type of industry, and other considerations are internal forces that will affect the community's mix of services. Whether the population is dispersed or concentrated, whether the population is predominately young, old, or middle aged, whether the population is increasing or decreasing, and the tax producing and type of employment in local industry will all undoubtedly make for differences in the array, magnitude, and distribution of services among communities.

Hypotheses About Service Mix

Mix can be viewed as both a dependent and an independent variable. The following model was developed by the NE-77 technical committee:



In the model five sets of hypotheses are identified (H_1-H_5). The first set includes those hypotheses treating service mix as a dependent variable (D_1) influenced by the independent variables of external and internal forces (I_1) outlined in the preceding section. A second set of hypotheses (H_2) treats mix as an independent variable (I_2) affecting the public good or public welfare of the community(D_2).

A third set of hypotheses (H_3) links the first level of independent variables (I_1) with the most general dependent variable, public good or welfare (D_2).

It will be recalled that within the description of mix, three dimensions were specified. These were array, magnitude, and distribution. A fourth group of hypotheses which the committee identified as significant were those dealing with the relationships among these five dimensions of service mix.

The fifth and last category of hypotheses the committee is developing include those hypotheses concerned with the relationships between service mix (I_2) and community growth or decline (D_3). The committee agreed that relationships between these two variables could be hypothesized in either direction. Mix can be hypothesized as affecting growth or decline, and growth or decline can be hypothesized as affecting mix.

Summary

An important term emerging from consideration of dynamics of service delivery within a community as opposed to analysis of single services across the region was "service mix." Mix has been viewed as having three dimensions—array, magnitude, and distribution. Array refers to existence or nonexistence of a specified set or subset of services. Magnitude refers to size and can be measured in several ways. Distribution refers to who in the community receives services.

Forces external and internal to the community may well affect the mix of services in a given community.

Service mix in a community can be viewed as both a dependent and an independent variable in relation to public good or welfare and community characteristics. A model was developed by the NE-77 technical committee to consider the relationships and hypotheses that emerge from such consideration.

THE UNIT OF CONTROL

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Control Unit Defined

One aspect of the study of community services' delivery systems that requires definition is the so-called "control unit." A control unit is defined as: (1) a geographic area within which the consuming unit (the family) acquires their basic services, and (2) an area which has the responsibility either directly or serves as the primary vehicle for providing most of the human services[1] used by the consuming unit. The control unit will usually be a governmental unit to which the family looks for services, be they provided or supplied by the private or public sector. Generally, for a specific service the control unit is synonomous with a unit of government.

[1]Included are such services as health, education, welfare, police, and fire protection.

The control unit can include minor civil divisions (village, township or town, city, or borough), county, regional, or special districts, or, in some cases, a whole state. For areas in the Northeast, most consuming units (families or households) look to the township (town) and/or to the county as the control unit. Vermont, New Hampshire and Maine rely or look to the town for most of their services; for New Jersey it's the township; for Maryland and West Virginia it's the county; and for New York and Pennsylvania it's the county and township. There are services for which the control unit is the state, such as welfare in Vermont. Another way of identifying the control unit is the level that has major fiscal responsibilities for funding community services.

The control unit usually will have the responsibility for primary and secondary education, roads, and public safety. The planning function for the use of the natural resource base generally resides with the control unit also.

The Importance of Identifying the Control Unit

From the standpoint of researching the delivery of community services, it is important to identify the control unit for (1) regional sampling schemes, (2) articulating the supply and demand for services, and (3) governmental interdependencies and interactions (linkages). These are not necessarily independent of each other.

Regional research committees are faced with the problem of developing sampling schemes so that collected data will be "representative" of a given population. Faced with the problem of extreme heterogeneity between and within states, stratification based upon selected criteria and a given entity[2] is required. Since many community services are supplied by a control unit with a majority of the clients (consumers) contained within it, stratification and sampling based on the control unit are desirable.

A basic concept often overlooked in the examination of the delivery of community services is supply and demand. On the demand side is the household or consuming unit. Through various methods including voting and expression of need through meetings, a general consensus is indicated. On the supply side is an organization attempting to assess this consensus in terms of total demand and how this need might be satisfied. However, without some articulation or refinement of the demand for services, there is likely to be an over- or undersupply at a given level of quality.

Consider the heterogeneity of demand within a given geographic area. For younger households, the preference may be for more education and recreation and very little welfare. For other households, the preference may be for more welfare, health care, and good roads but little education and recreation. Varying income levels and the rural/urban mix may add to the complexity of demand refinement. Without demand refinement or articulation, it would be like arriving at the food needs of a family by looking at their total annual expenditures. What is needed is a breakdown by major food groups and seasonal variation in purchases along with the quality of food desired and annual income.

On the other side is meeting this demand with the right quantity and quality of each service at minimum per unit cost. The unit supplying the respective ser-

[2]This could include a household, minor civil division, county, or state.

vices must consider how it can best be supplied most effectively. Alternatives include contractual arrangements with neighboring governmental units or with private organizations.

Identifying the primary control unit is important also for governmental interdependencies and interactions.[3] Control units will have connections with other units both vertically and laterally. Similar control units supply similar services—lateral connections. In other cases a service may be provided by a state or county agency but through the minor civil division.

The Inside/Outside Aspect of the Control Unit

In the delivery of community services, particularly in rural areas, one must give consideration to the movement of the consuming unit between control units because of the geographic dispersal of certain services. All families will be located in a minor civil division but use a service supplied by a larger unit of government or a different control unit. Thus, for certain services one needs to think in terms of a human service trade area or a radius encompassing the human service being provided. Generally, this vertical and lateral movement of the consuming unit (family) is less important for services rendered primarily by the private sector.

Most decisions regarding the consumption or use of human services are made by the household or family. While a majority of the services will be consumed within the primary control unit, there are areas where substantial use or demand is made by the transient consumer. A case in point is the demand for medical care at ski resorts in winter and the seasonal home occupants during the summer months. Do these transient consumers then provide the "critical mass" which results in the formation of a service that is otherwise not supplied or do they preempt the consumption of an existing service by the permanent residents? Also, what happens to the service mix when the "seasonal" home communities become permanent communities?

The Extent of Variation of Control Units in the Northeast

The variation and number of governmental units providing a community service is illustrated in this section. The variation existing between the 12 northeastern states in regard to (1) number of governmental units, (2) total revenue and intergovernmental transfers, and (3) state and local employment is first examined; secondly, the variation in 12 control units is illustrated.

In the 12 northeastern states there are about 13,900 local units of government with 81 percent possessing the property taxing power. There are 4,138 townships, 4,095 special districts, and 2,564 municipalities. Two states—Connecticut and Rhode Island—have no counties; and three states—Delaware, Maryland, and West Virginia—contain no townships. Data are portrayed in Table 1.

The extent of Federal and State support to local government is illustrated in Table 2. One measure of the amount of support is the ratio of funds generated at the local level to the total funds available. The ratio varies from 1.1 for New

[3]This concept is discussed in detail by Owen and Longest in "Linkages in a Community Services Delivery System Model."

Table 1
Local governments, by taxing power, type, and public school systems, 12 northeastern states, 1967

State	All local government units								
	Total	With property taxing power	No property taxing power	Total	Counties[1]	Municipalities	Townships	Special districts	Public school Systems[2]
Connecticut	413	340	73	404	—	34	149	221	178
Delaware	170	106	64	120	3	52	—	65	51
Maine	698	584	114	633	16	21	469	127	334
Maryland	361	199	162	361	23	151	—	187	24
Massachusetts	654	477	177	610	12	39	312	247	398
New Hampshire	515	481	34	334	10	13	222	89	190
New Jersey	1,421	1,242	179	899	21	335	232	311	605
New York	3,485	3,455	30	2,569	57	616	931	965	939
Pennsylvania	4,998	3,374	1,624	4,249	66	1,005	1,554	1,624	803
Rhode Island	109	90	19	106	—	8	31	67	40
Vermont	656	634	22	389	14	65	238	72	267
Vest Virginia	455	336	119	400	55	225	—	120	55
Northeast	13,935	11,318	2,617	11,074	277	2,564	4,138	4,095	3,884

[1]Excludes areas corresponding to counties but having no organized county government.
[2]Includes 1,608 other local public school systems operated as part of a State, county, municipal, or township government and excluded from independent school-district figure and from "All types of local governments."

Source: U.S. Bureau of the Census, Census of Governments: 1967, Vol. 1, Governmental Organization as compiled in U.S. Bureau of the Census, *Statistical Abstract of the United States: 1972* (93rd edition), Washington, D.C., 1972. Table No. 648.

Table 2
General revenue of state and local governments—
Origin and allocation, 12 northeastern states, 1970
(in millions of dollars)

State	Total general revenue	Origination level of government[1]			Final recipient level[2]				Ratio of funds generated locally to final fund level[3]	Local aid per capita from State and Federal level[1]
		Federal	State	Local	State	Local	State	Local		
		Percent			Amount		Percent			Amount
Connecticut	1,970	13	44	43	867	1,103	44	56	1.3	87
Delaware	379	13	64	23	190	190	50	50	2.2	186
Maine	541	18	47	35	289	253	53	47	1.3	64
Maryland	2,654	13	47	39	924	1,730	35	65	1.7	174
Massachusetts	3,841	16	41	43	1,704	2,137	44	56	1.3	83
New Hampshire	367	17	35	47	173	195	47	53	1.1	28
New Jersey	4,323	12	37	50	1,391	2,932	32	68	1.3	105
New York	16,221	14	43	44	3,777	12,444	23	77	1.8	293
Pennsylvania	6,618	15	47	38	2,911	3,706	44	56	1.5	103
Rhode Island	573	20	48	31	317	257	55	45	1.4	82
Vermont	321	23	52	26	206	115	64	36	1.4	72
West Virginia	923	29	49	22	551	372	60	40	1.8	96
Total	38,734	15	43	42	13,300	25,434	34	66	1.6	166

[1]Before intergovernmental transfers.
[2]After intergovernmental transfers.
[3]Total revenue available per dollar generated locally.

Source: U.S. Bureau of the Census, Governmental Finances in 1969-70, as compiled in U.S. Bureau of the Census, *Statistical Abstract of the United States: 1972* (93rd edition), Washington, D.C., 1972. Table No. 660.

Table 3
Governmental employment, 12 northeastern states, 1971

State	Full-time equivalent employment of state and local governments					
	Number (1,000)			Per 10,000 population[2]		
	Total	State	Local[2]	Total	State	Local[2]
Connecticut	116	39	78	377	125	252
Delaware	27	12	15	482	213	268
Maine	41	15	26	408	149	259
Maryland	171	53	118	427	132	295
Massachusetts	237	64	172	411	112	299
New Hampshire	28	10	18	369	137	232
New Jersey	279	62	217	382	85	297
New York	945	184	761	514	100	414
Pennsylvania	423	122	301	356	103	253
Rhode Island	37	15	22	382	153	228
Vermont	20	10	10	429	211	218
West Virginia	74	31	43	421	175	246
Total	2,398	617	1,781	434	112	322

[1]Subject to sampling variation.
[2]Based on population estimated as of July 1, 1971.

Source: U.S. Bureau of the Census, Public Employment, as compiled in U.S. Bureau of the Census, *Statistical Abstract of the United States: 1972* (93rd edition), Washington, D.C., 1972. Table No. 676.

Table 4
Selected data, 12 control units, northeastern United States, 1973

State and County	MCD[1]	Population 1960	Population 1970	Population % change	Area sq. miles	Topographic features	Economic base	Income 1960	Income 1970	Income % change	Proportion commuting (%)
New Hampshire	Stratford	1,029	980	-5	81	Mountainous	Bedroom community	NA	7,136	NA	NA[2]
	Jefferson	600	714	+19	51	Mountainous	Recreation	NA	7,483	NA	NA
New Jersey Sussex Cty.	Vernon Twp.	2,155	6,059	+181	68	Mountainous	Agr. to recreation	NA	NA		10
Maine	Rome	367	362	-2	24	Rolling	Agr.-Rec.	NA	8,042	NA	70
Kennebec Cty.	Randolph	1,724	1,741		22	Rolling	Retail Rec.	NA	8,530	NA	
	Vassalboro	2,446	268		45	Rolling	Agr.-Mfg.	NA	8,964	NA	
Maryland											
Frederick Cty.		71,930	89,927	+18	664	Rolling	None	5,026	9,550	90	22
Calvert Cty.		15,826	20,682	+31	219	Flat	None	4,566	8,741	91.4	35
Pennsylvania											
Bradford Cty.		54,925	57,962	+6	1,148	Rolling	Mfg., Agr.	4,906	8,461	10.5	20
Cameron Cty.		7,586	7,096	-7	401	Mountainous	Mfg., Agr.	6,548	9,850	50.4	9
Vermont	Underhill	730	1,198	+64	49	Rolling	Agr.	2,896	11,269	289.1	75
Chittenden Cty.	Jericho	1,425	2,343	+64	33	Rolling	Agr. Residential	5,206	10,279	97.4	60
Essex County	Brunswick	62	45	-27	32	Rolling	Forest	8,625	6,333	-26.6	80

[1]Minor Civil Divison.
[2]Not available.

Hampshire to 2.2 for Delaware. In New Hampshire, local governments generate 47 percent of the State and local revenue and receive 53 percent of the total revenue for final allocation. The ratio for the 12 northeast states is 1.6, with local governments generating 42 percent and receiving back 66 percent of the State and local general revenue.

Variation in State and local employment also exists in the Northeast. Full-time equivalent employment ranges from 218 per 10,000 population in Vermont to 414 in New York for local government. Pennsylvania has the lowest rate for all State and local units (Table 3). This, however, does not take into account voluntary service which can be quite significant at the local level for some services like rescue squads and fire protection.

The extent of the variation in 12 selected control units is portrayed in Table 4.[4] The variation in area is from 664 square miles (Frederick County, Maryland) to 22 square miles (Randolph Township, Maine). Population change between 1960 and 1970 ranges from a seven percent decrease (Cameron County, Pennsylvania) to an increase of 181 percent (Vernon Township, New Jersey). Total population varied from about 90,000 (Frederick County, Maryland) to 362 (Rome Township, Maine). The economic base ranged from forestry to manufacturing to retailing. Income change between 1960 and 1970 varied from a decrease of 27 percent to an increase of nearly 300 percent.

The variation in data availability revealed adequate data for county level control units but limited and scattered data for many minor civil divisions. Thus, the number of important variables that could be used for stratification of the control units for sampling purposes is limited.

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[4]The information reported in this section is drawn from data compiled on 65 control units by members of the NE-77 technical committee for purposes of selecting control units for case studies. These areas meet the rural development definition. These are not the areas finally selected for study.

SITE SELECTION CONSIDERATIONS FOR REGIONAL REPRESENTATION

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Regional Variation

Because of the regional variation in the control units (unit of government providing most human services), size of population, topographic features, location, economic base, family income, community goals, commuting and dominant cultural characteristics, stratification and/or grouping of similar control units is necessary. Also, through grouping or stratification, certain variables can be held constant so that the net effect of variation in physical, locational, social and economic differences can be evaluated on a regional basis as it affects the delivery of human services in nonmetropolitan communities.

Without the stratification of the control units and the use of secondary and primary data, the cause and effect relationships that affect service delivery and service mix cannot be easily identified.

Data Availability

In addition to the problems of interregional variation are the difficulties of availability and complementarity of data. It is difficult to find comparable data for the appropriate unit of control (unit of government) for the same time period and for the same variable. This is particularly true, for example, for income. Also, the determination of the amount of change between two time periods is desirable; but data are frequently missing for one year or the other or both. Also, data may not be of recent vintage to reflect current changes in the control unit.

Data Input for Site Selection

The following is a list of variables that are useful to identify homogeneous subregions (stratification):

1. Unit of Government
2. Geographic features
   a. Size
   b. Topography
   c. Significant natural features
   d. Location
3. Socioeconomic makeup
   a. Income
   b. Income change
   c. Population
   d. Population change
   e. Proportion below income poverty level
   f. Age and age distribution
   g. Education

h. Family size
i. Occupation

4. Quality of Housing Indicators
   a. Housing with plumbing
   b. Housing with hot water
   c. People/room
   d. Rental rate
5. Economic Base
   a. Industrial
   b. Manufacturing
   c. Agricultural
   d. Commercial
   e. Recreational
6. Transportation
   a. Proportion commuters
   b. Highways/capita
7. Educational Facilities
   a. Equalized valuation per pupil
   b. Expenditures per pupil
8. Medical Care
   a. Doctors/10,000
   b. Hospital beds/10,000
   c. Dentists/10,000
9. C[illegible]ment Finance
   a. Revenue per person
   b. Tax paying ability
   c. Proportion of tax ability used
   d. State and Federal support
   e. Debt service per capita
10. Government Employment
    a. Total full-time equivalent
    b. Total full-time equivalent/10,000
    c. Average salary
11. Volunteer Service

Tools Available

A number of methods can be used to systematically analyze individual or sets of variables for purposes of grouping observations (control units) into homogeneous clusters from which random samples can be drawn. One basic method which becomes useful when few variables are available is a stratified probability sample. This method has been used in the NE-77 project so far and is described in Appendix B. Observations are stratified by their individual characteristics so as to reduce population variance. As more variables become available, greater specifications can be made of types of communities to be sampled. The following methods can be used to uncover any interrelationships among community characteristics, thereby enabling parsimony in selection of sampling characteristics.

Principal Component Analysis: Principal component analysis is basically used as a data reduction procedure. In this technique a number of variables are com-

bined into a single component value called a "derived response." The derived response can be thought of as a type of composite index. Its value may be positive or negative.

This technique, as with cluster analysis, may be used to provide a grouping or ranking based upon selected data. A set of derived responses would be computed for each control unit. The control unit would then be grouped based on the magnitude of the set of composite values. Once grouped, the data may be further analyzed using discriminant analysis.

The limitation of principal component analysis is that a unique interpretation may not be placed on the derived response. That is, different investigators may interpret the derived response in different manners.

Cluster Analysis: Cluster analysis can be used to objectively subdivide a group of observations into homogeneous clusters or subgroups. This analysis may use one or more variables to cluster the observations. For the Howard type of clustering, distances between each possible pair of observations are computed. The closest pair of observations, or pair with the smallest computed distance, is selected as the center of the first cluster. Observations are added to this cluster until a specific cut-off point is exceeded. Of the remaining observations, the next closest pair is selected as the center of the next group, etc. The process is continued until the desired number of subgroups is formed.

Each observation then is representative of the cluster in which it is located. Each cluster will be homogeneous from within and distinctly different from any other cluster. In other words, cluster analysis minimizes the difference within the cluster while it maximizes the differences between clusters. Also, if the variables are agreed upon, it provides a systematic method which is repeatable.

Cluster analysis can be used to cluster units into groups with similar characteristics, such as increasing incomes and increasing populations. Several clustering techniques and programs are available depending upon the specific purpose and need.

Discriminant Analysis: Discriminant analysis can be used to classify observations into the best fitting populations. This technique determines differences between the populations on the basis of random samples drawn from each population. (Each population is assumed to be multivariate normal with different means, and all populations have identical covariance among variables.) Population differences are evaluated considering several variables simultaneously (multiple discriminant analysis). Individual observations can then be classified into the population for which the probability is the greatest. Observations, involving at least two variables, must be grouped into populations before individual observations can be evaluated.

This technique may be used to determine the probability of a particular unit falling within certain groups. The groups, though, would first be developed using a technique such as clustering analysis or principal component analysis.

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THE PROVIDER SIDE OF COMMUNITY SERVICES

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The provider and consumer dimensions of community services can be thought of as representing different sides of the same coin. The former approaches the economist's notion of supply and the latter is similar to the concept of demand. The primary purpose of this section is to briefly discuss those ideas and activities relating to the provider dimensions of the overall study. Of necessity, this discussion will occasionally duplicate some of the information contained in the next section of the report which deals with the consumer dimension.

In applied research, it is particularly important to ask the "why" or "so what" questions regarding the appropriateness and relevance of a particular researchable theme. The proper question here is "Why is research that focuses on the provision of community services a justifiable research theme?" It seems that the logical answer to this question lies in the supposition that service provision is one of the variables affecting "community welfare" or "quality of life." In particular, the NE-77 researchers isolated four aspects of service provision which they posited as being important in influencing "community welfare." These aspects of service, which are discussed below, are (1) quantity of services provided, (2) equity in service provision, (3) quality of services provided, and (4) efficiency in service provision.

1. *Quantity of services provided.* The relationship between quantity and "community welfare" is based on the assumption that more services are preferred to fewer services, *ceteris paribus*. Two measures of quantity—array and magnitude—were operationalized. The array dimension refers to which services out of a predetermined set of services are available in a given area. For any given service the answer to the array question is either "yes, the service is present" or "no, the service is not present."

   On the other hand, *magnitude* refers to the specific level of service provision. This measure becomes operationally difficult because no clear consensus exists on what is the appropriate unit of output for measuring the level of provision for many services. For example, should the level of health services provided refer to the number of people treated or to the outcome of the treatment on "health"? Conceptually, measuring the ultimate outcome or effect of a particular service is difficult to fault. Operationally, this approach presents almost insurmountable problems. In view of these operational problems the approach of NE-77 was to collect data on a number of intermediate outputs and proxies for these outputs such as "the number of people served" and "dollar volume of services provided."

Collecting data on the magnitude aspect of quantity necessitated the development of a "provider questionnaire." On the other hand, much of the data on the array aspect of quantity was available from such secondary sources as telephone directories and directories of community services.

2. *Equity in service provision.* The relationship between equity and "community welfare" is based on the assumption that a "just" distribution of services is preferable to an "unjust" distribution. Unfortunately, the researcher is not able to provide definite answers to the question of what is "just" and "unjust" due to different conceptions of what is equitable. Some feel services should be provided on the basis of need, while others feel provision should be made only to those who can afford the going price. Although researchers are at a loss to specify "what should be" with respect to equity considerations they can provide valuable insights regarding "what is." This was the approach taken by NE-77.

   One of the more important and researchable equity themes is to determine who pays and who benefits from the provison and consumption of a particular service or services. Answering this question requires an analysis of how services are priced and financed, as well as determining the socioeconomic characteristics of those who benefit and pay for the service. Because many community services are considered to have substantial externalities in consumption, it is important at a conceptual level to recognize that those who consume a service will not necessarily be the only beneficiaries. For example, the primary or direct beneficiaries of education are presumably the students who find themselves with higher skill levels, greater earning potentials, etc. At the same time it is frequently argued that the larger community benefits from having a more intelligent and literate citizenry. Because these secondary or external benefits are difficult to isolate and quantify, the focus of NE-77 has been to consider only the primary or direct beneficiaries by attempting to determine who actually consumes various services.

   A related question is who does not consume services and more importantly why, i.e., what barriers, if any, prevent the potential consumer from using a service. Perhaps the reason for nonconsumption is the absence of need—either perceived or "real." On the other hand, the need may be present but the ability to translate this need into effective demand may be absent due to income or transportation factors, imperfect knowledge, cultural differences between provider and consumer, or a time schedule of operation by the provider that does not mesh with the consumer's schedule.

   With respect to equity considerations it is obvious that the interrelationship between the consumer and provider dimensions of community services becomes particularly important. Because of this strong interrelationship, the development and administration of data-gathering instruments for receiving information from providers and consumers were done concurrently. These instruments attempt to provide information on how services are priced and financed, who does and does not consume, the socioeconomic characteristics of consumers and nonconsumers, and why nonconsumers do not consume.

3. *Quality of service provided.* The relationship between quality and "community welfare" is based on the assumption that higher quality services are preferable to lower quality services, *ceteris paribus*. The obvious difficulty in researching this aspect of service provision is measuring quality. In general,

two approaches that can be taken are the objective and the subjective. The objective approach had reference to the establishment (usually by "experts" or "professionals") of quantifiable norms or standards (such as the teacher-pupil ratio or the number of courses offered in an educational system). One of the difficulties of this approach is the lack of agreement among experts or professionals regarding the validity of these measures and the numerical values that should be attached to a particular qualitative concept. The subjective approach usually has reference to an ordinal measure of quality based upon an individual's perceptions. These perceptions may vary from individual to individual. Examples of such measures are how "satisfied" the consumer is with a service or how "adequate" a provider feels his service is. It is highly desirable to capture these types of qualitative perceptions from both consumers and providers and to determine possible differences in perceptions between the two groups. In the case of quality considerations, as with the equity aspect, it becomes particularly difficult (even for discussion purposes) to neatly dichotomize the provider and consumer dimensions.

4. *Efficiency in service provision.* The relationship between efficiency and "community welfare" is based on the assumption that efficiency in the provision of community services is preferable to inefficiency, *ceteris paribus*. Given the definition of efficiency as maximum output per unit of input, and the earlier described problems of defining and measuring output it is clear that the calculation of various levels of efficiency in service provision is not an easy task. NE-77 has not actively pursued this particular theme.

Summary and Conclusions

Four general aspects of service provision presumed to be important in influencing "community welfare" or "quality of life" can be isolated. These aspects are (1) quantity of services provided, (2) equity in service provision, (3) quality of services provided, and (4) efficiency in service provision. In most cases, data for providing insights into these four aspects can be gathered from secondary sources and from a provider questionnaire. In the case of the equity and quality aspects of service provison the data gathering and analysis need to be closely coordinated with the consumer analysis (see next section of report).

Because so little research on service provision has been undertaken on such a broad front as is being done in NE-77 the nature of the research is not policy-specific. Instead, the research is more exploratory and descriptive in the sense of gaining general insights into a broad range of factors associated with service provision. Justification for an exploratory and descriptive emphasis stems from the feeling that it is most logical to determine "what is" in the way of service provision before grappling with why it is the way it is.

THE CONSUMER AND THE HUMAN SERVICE SYSTEM

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Crawford et al., in the introduction to this monograph, recognize a potential dilemma for the researcher of community services: "whether to focus on services as a factor in rural development or on services as a contribution to individual and family welfare" (p. 8). Is community development or family development the raison d'être of community services? It is a moot question whether either type of development can reach its optimum level without the other, and the which-comes-first argument will not be pursued here.

Alternative Orientations for a Consumer Survey

A related, but different, set of alternative orientations for researching the service consumer comes to mind:

(a) The major thrust may be to describe the consumer's response to the service system. Type A questions include, among others: What services does the consumer use? What degree of consumer satisfaction/dissatisfaction is expressed? What barriers to service access are perceived?

(b) Or the primary concern may be to assess the service system's responsiveness to consumer needs and desires. Appropriate Type B questions ask: Are diverse subpopulations of consumers served equally well? To what extent is the service system visible to and understood by its potential clientele? How successful is the system in minimizing barriers—both real and imagined—that may stand between service providers and service users? How open is the system to the consumer's suggestions for change? From what strata of the population do its policy makers and volunteers come?

The two orientations undoubtedly differ in their attractiveness to individual researchers. They may arise out of different philosophical positions with regard to the consumer-provider relationship. Perhaps researchers who give high priority to the community-development value of human services will be interested primarily in the consumer's response to the system, whereas those who value services as facilitators of family development will be inclined toward assessing the system's responsiveness to consumer needs. The relationship between these two sets of orientations, however, is by no means perfect.

Implications of the orientation chosen. The choice between studying the consumer's response to the system or the system's responsiveness to consumer needs involves practical as well as philosophical considerations. To study the latter requires studying the former, and more. Consequently, in making the choice one must take into account probable differences in level of resource commitment required (funds, time, expertise). One will also want to weigh the difference in payoff potential.

Questions of Type A above are straightforward and can be asked directly of consumers. Responses can be summarized using relatively simple procedures that are easily understood. The time span between planning and reporting

stages of the research can be short. Type B questions, by contrast, are less straightforward; they are answered by relating Type A responses to other variables, some of which cannot be measured so directly (e.g., consumer needs and understandings, or openness of the system to consumer suggestions for change). More complex analyses will be needed, some of which yield results that are full of meaning when understood, but difficult to explain to the non-researcher. The time span between initial conceptualization and final reporting can seldom be predicted accurately, but will almost invariably be longer than expected.

Type A reports, though simple, can have strong immediate appeal to persons close to the research target (local planners, policy makers, service providers, consumers) due to their obvious reality base. Their usefulness may be limited because they become outdated quickly and because it is questionable that their results can be generalized to populations beyond the area from which the sample is drawn. A regional study, sampling several populations scattered across the region, can test generalizability: i.e., if results across samples are consistent one can expect greater generalizability than if they vary widely. If the research is focused on services as a factor in rural development, then determination of relationships between survey responses and characteristics of control units will enhance the value of the reports. Needless to say, interpretation of such relationships must be approached with caution unless it is reasonable to consider the control units as a sample drawn from a single population of such units.

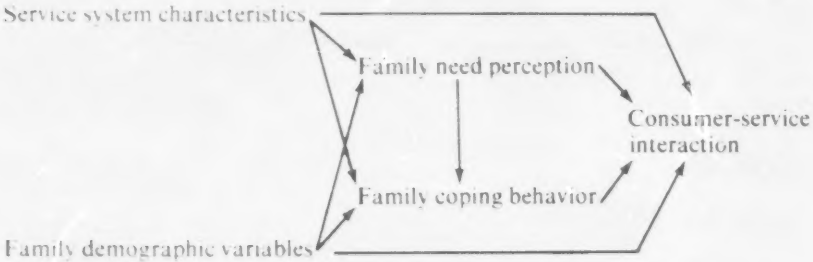
Potential use in service evaluation. Responses to either set of questions listed above may be of interest to researchers and policy makers concerned with service evaluation. The two sets of questions, however, may suggest different evaluative criteria. Evaluators confining their inquiries to Type A questions may tend to work on the assumption that the more use, the greater the satisfactions, and the fewer the perceived barriers, the better. Those asking Type B questions may make the additional assumption that high quality systems will be characterized by equity of service distribution: i.e., service users will seem to be representative of the total population for whom the service is intended; and there will be no identifiable subpopulations whose members receive less services than others, who are less satisfied with services than others, or who more often perceive the system as excluding them from services they need. The quality of a service system may be judged, also, by the degree of public awareness and understanding of the system, with understanding expected to extend to the various subpopulations of the community. Potential indicators of understanding may be congruence between consumer and provider perceptions of the system, or between consumer perceptions and objective reality. A third criterion of quality may be the extent to which the service system draws its policy makers and its personnel—both employer and volunteer—from diverse segments of the population.

In the case of each of these proposed quality indicators, the assumption is made that consumer-service system interaction should be independent of variables commonly used in describing families: e.g., size, stage in family life cycle, income and/or other measures of socioeconomic status, and location in relation to major population centers. This is admittedly a utopian dream. Of interest to the evaluator is the relative strength or weakness of such variables in explaining service use, satisfaction, and the like.

At least two additional sources of variance in consumer behavior are hypothesized:

1. perception of need for services, both for self/family and for the community at large; and
2. family coping behavior, i.e., the family's tendency to take positive steps in its own behalf, to see a positive future for itself and to be actively engaged in moving toward it, to see present barriers as walls to be knocked down or detoured around rather than as fixed boundaries.

These variables are undoubtedly influenced by both service system characteristics and family-level demographic variables. Given the needed resources, including access to an adequate sample of service systems and consumers, one might attempt to predict consumer behavior vis-à-vis the service system with the following model:



A feedback model would be more appropriate than a linear model, although more difficult to test. Given a highly responsive service system, one could conceive of a complete reversal of the model. Consumer satisfaction derived from service use could stimulate a higher level of coping behavior and/or could extend perception of need for service opportunities in the community. If such changes occurred in a critical mass of families, then changes might occur also in family socioeconomic status and/or in service system characteristics.

Regardless of the orientation of the research, it is likely that in most studies of consumer-service system interaction there will be a need for some data collected directly from service consumers. The remainder of this paper focuses on methodological considerations relative to planning service consumer surveys, with particular attention to population definition, development of survey instruments, and selection or development of data-reduction strategies.

Populations of Interest

When one sets out to study the service system from the point of view of the service provider, one logically selects a control unit or a set of such units, examines the providers located within the area(s) defined, and considers the linkages that tie those providers to each other, to their clients, and to the outside world. When the system is to be considered from the point of view of the consumer as well as the provider, the control unit concept is also valuable in establishing population parameters.

The geographic/political boundaries of the control unit, however, often exert less actual "control" over user behavior than either the social planner or the researcher may anticipate. The system usually places restrictions on where the consumer can go for some services; e.g., the boundaries of public school and public welfare districts are clearly defined. But for other public services and vir-

tually all those in the private domain, the consumer has some freedom of choice. People differ in the extent to which they are oriented to the control unit in which they live as a source of human services. As a result, the population of service consumers residing in a control unit and the population of consumers of services located within that unit are usually overlapping but by no means identical populations.

In defining the population of service consumers, then, the researcher must decide whether the residents of the control unit or the clients of the services located in the unit make up the population of interest. In a study of service mix, this is perhaps a nonissue, since it is likely that few consumers will travel outside the control unit for all their services. In addition, few researchers will have the resources to locate the population of clients of the specified service system.

Because of the peculiarities of consumer/service system interaction, there are advantages to defining the consumer population as a population of families or households. A very large majority of individuals operate in the service system not entirely as individuals, but rather as members of family groups who have some commitment to each other over time and who share resources and a common living space. A given service, such as income maintenance or assistance in locating suitable housing, may be a service to the family as a unit rather than to any one individual. Another service, such as primary health care, may be used by an individual for his own purposes, but may at the same time be a service to the entire family unit: in protecting or restoring the health of the individual it prevents or reduces the attendant drain on resources of the unit as a whole.

Shared family resources include not only material wealth but also the skills, knowledge and attitudinal base from which family members operate. In a biological family, members also share a genetic base. All of these resources, plus the status of the family in the community at large, tend to make the members of the unit more homogeneous with respect to needs, perceptions, and overt behaviors vis-à-vis the service system than would be a similar number of persons selected randomly from the entire population. To the extent that the household can be characterized as homogeneous, there are methodological arguments for considering it as the appropriate population element (for elaboration of this point see page 84).

If the consumer population is defined as the population of families/households within one or more control units, certain subpopulations may be excluded, e.g., individuals living in residential care units or in residential situations provided by educational institutions or employers. In addition there are subpopulations, many of whose members are also members of families, whose points of view may be missed in a survey of households where one person speaks of the entire family; examples of these are distinct age groups such as young children or adolescents or elderly persons.

For an initial study of service mix, the family or household may be the most logical population element, since it is within this unit that the mix of service need and response is likely to be most complex. To obtain a more comprehensive picture, however, the researcher will need to supplement the intital survey with others focusing on subpopulations such as those mentioned above.

Developing the Interview Schedule

Defining scope. Decisions regarding the scope of a consumer survey obviously must take into account the purposes of the survey, including its intended con-

tribution to the research as a whole. Interest in service mix as it exists in selected communities favors defining the scope of a consumer survey broadly. The following discussion sets forth some of the realities of attempting to study a complex service system, or nonsystem, with limited resources. These realities may force a narrower definition of scope than the researcher finds desirable. Some possible procedures are suggested for dealing with the realities without placing serious limitations on scope.

Consumer's limited perceptions of the system. To assess consumer response to the service system, or vice versa, one must take into account not only the parameters of the system as viewed by the policy makers and the service providers, but also the consumer's perceptions of the system. It seems safe to assume that relatively few laymen give much thought to the service system as a whole. Many may be aware of only limited segments of the system. Most will likely respond only to those segments with which they have had direct contact. For some, the recongized system elements will be individual caregivers who have been responsive to their needs, rather than the provider agencies themselves.

Lack of system-level terminology. As the researcher attempts to determine the consumer's perceptions of the service system, communication is complicated by lack of system-level terminology, especially in the everyday language of people. How does the researcher make the focus of his study clear to the service consumers from whom he expects to collect his data? There is no concise and easily understood terminology to use in referring to the system as a whole.[1] The researcher is forced, instead, to phrase interview questions in terms of individual service subsystems.

Subsystem differences. The subsystems, themselves, differ in their recognizability as units. The ***health*** system, though complex, is relatively clear. Doctors, nurses, hospitals, clinics—all fit together in most people's minds, and most people have had some experience with one or more segments of the system. Frequently one counts on a single physician to introduce one to any part of the system from which services are needed. The public generally professes confidence in medicine as an institution,[2] but many persons indulge in self-diagnosis and prescribe their own treatments.

The ***education*** system is also complex and many parts of it are relatively clear. It differs from the health system, however, in that almost continuous use of the system for eight or more years is mandated for most young persons and, for those using the public schools, the system dictates what service provider must be used. The public school system serves a very large segment of the

[1] In the initial planning for the NE-77 consumer survey there was general agreement that it should focus on those services thought to have most direct impact on the well-being of families—primarily the human services plus housing, legal and financial services, and transportation as it becomes a factor in service use. At one research site, members of the survey staff met with outreach workers from three agencies to explain the proposed survey and to get their reactions to possible approaches the interviewers might use. Three terms were suggested for introducing the interviewee to the focus of the interview. All three were rejected as communicators: "community services" conjured up visions of water and sewage systems, highway maintenance, police protection and the like; "social services" was said to have negative connotations for many people because of its close association with the welfare programs; "human services," a term new to most of the aides, was interpreted by some to mean personal services to the human body such as grooming or body building.

[2] A Harris poll reported widely in the media in late 1973 (e.g., see *The New York Times* for December 3, 1973, p. 34) indicated that 57 percent of the sample expressed "a great deal of confidence" in medicine, the highest percentage given for any institution listed.

school-age population (about 85 percent in the Northeast), but many parents seem passive toward the schools. They regard education of the young as a necessity, want their children to have as much as possible, but relatively few attempt to exercise influence over the nature of education available to them.

The public *welfare* system differs from both health and education systems in that it draws its clientele from a limited segment of the population, generally those persons with least social status, rather than from all. Its most visible service, income maintenance, tends to obscure its role in mental health, family counseling, child welfare, and the like. Among influential community members it may be recognized more often as a burden to taxpayers than for the services it renders.[3]

The human services other than health, education, and public welfare are characterized by fragmentation in many communities. The researcher has the option of focusing interview questions on types of services used or on interaction with specific service agencies. The possible array of service types is extensive and cannot be organized easily into a few commonly recognized categories (see Appendix A for one attempt). The list of agencies in a given community will be long, also, since most communities support many small organizations with overlapping functions. Regardless of the approach taken to determine extent of awareness or use of these services, the interviewer may collect many negative, "don't know" or "no answer" responses. At least these interpretations are plausible: the individual family uses a very restricted range of all the services provided by a community; the interviewee is not aware of, or does not easily recall, where family members receive small services, or the interviewee is unwilling to provide information regarding family interaction with some service agencies.

Concern for relevance. Relevance of the data gathered in the survey will determine to a large extent the value of the results to policy makers. In addition, it is doubtful that valid indicators of affective response to services will be obtained unless the interviewee perceives the questions asked to be relevant to the local situation. Lacking this, few interviewees will become sufficiently involved in the interview experience to respond at more than a superficial level.

In a regional study, the problem of maximizing relevance is exacerbated by the desire to have a common data set for all control units and by differences in stages of service development across the region. The logical way to achieve the goal of a common data set is to develop a common interview schedule to be used in all control units. To achieve this, there may be a strong tendency to compromise relevance for the sake of uniformity. A reasonable alternative may be to reach agreement on the specific variables to be measured at each site, with the measures to be tailored to the situation in each control unit.

Consider, for example, the variable: extent of enrollment of preschool children in educational programs. In the common-schedule approach, preschool ages may be defined, say, as five years and younger, and preschool educational programs as organized group experiences offered for this age group. These are

[3] *Rankings of the States*, an annual publication of the National Education Association's Research Division, ranks the states on governmental expenditures and debt. (For example see pp. 48 to 52 in the 1970 edition.) Since 1968, states have been ranked from low to high on public welfare expenditures and on debt, whereas they are ranked from high to low on expenditures for other services: education, health, police protection, fire protection, and highways. The implication is that most public expenditures are positive, whereas welfare expenditures and debt are negative.

appropriate definitions for communities in which public school programs begin at the first grade level, but less appropriate where schooling begins with kindergarten. In the common-variable approach, preschool age may be defined as the age range of children too young to be permitted to enter the public school system. Interview schedules may then differ for control units with and without public school kindergartens, so that kindergarten enrollment, when it is readily available to children, is distinguishable from enrollment in other types of "preschool" programs that may be less accessible.

For a second example consider the variable: level of interest in possible future services for the elderly. If a common schedule is desired, the researchers may agree on a list of services to which interviewees will be asked to react. In communities where the introduction of the specific services listed is under active consideration, questions about them will be most appropriate. In other communities where these or other similar services are already available, responses to questions about them may provide no indication at all of level of interest in possible future services.

The common-schedule approach has distinct advantages in terms of ease of describing procedures, coding, computer programming, and preparing tables of findings. Its disadvantages show up at the interview stage if dysfunctional definitions are forced on the interviewee, or awkward questions are asked when more straightforward ones would be possible. It sometimes leads to inconclusive or uninterpretable results. The common-variable approach has seldom, if ever, been used in a situation like regional research where a large group of scientists must reach agreement on variable definition and measurement. It would not be easy to implement. Some authors have used it effectively in synthesizing results of several studies with similar but not identical sets of data.

Dealing with schedule length and complexity. Almost every problem raised in this discussion contributes to a major dilemma faced by those who would study consumer-service system interaction: how to develop data-gathering instruments that meet the needs of the research and are also acceptable in the demands they make on the research subjects. There must be reasonable limits placed on the length and complexity of the interview schedule if one values full cooperation of the persons selected to be interviewed.

The simplest approaches to the problem are: limitation of the scope of the inquiry to a few services, a choice which necessitates giving up the focus on service mix; or limitation of the number and types of variables to be measured for each service.

A realistic procedure for a regional study may be to develop a core questionnaire to be used in all control units, with individual researchers free to add to it, but not to omit items nor to alter them in such a way as to change their meaning. The core questionnaire can be limited in either or both of the ways suggested above. This may provide maximum opportunity to make the interview schedule relevant to the individual control unit, while still yielding useful data common to all sites from which data are collected across the region.

The schedule developed for even a single control unit may need to be much more restricted in scope than the researcher deems desirable. Perhaps there can be a basic schedule for all interviews with several supplements, each adding to the body of data to be collected about a limited part of the service system. As envisioned, each basic schedule would have only one supplement. For example, if there were three supplements there would be three forms of the schedule, each

to be used in a random third of the interviews. To make the approach effective, a relatively large sample would be needed, since some of the data would be available for only a fraction of the sample. There would be no way to study interrelationships among data secured from the several supplements.

Another possibility may be to arrange for two or more interviews in each participating household, with the basic schedule used for the initial session. The succeeding interview(s) could be used primarily to extend the scope of the study, but it would also offer opportunity for some repetition of questions to test reliability. Success with this approach would probably be dependent upon the researcher's ability to arouse and sustain interest throughout the interview.

Data Reduction Problems

It is no easy task to conceptualize some of the analysis problems likely to arise in a study of consumer response to the human service system and/or the system's responsiveness to consumer needs. Almost every topic introduced in this paper, every issue raised, relates in some way to the complexity of the research problem. A few thoughts about data reduction in the face of some of the complexity are discussed here—admittedly only partial consideration of only a limited set of problems.

By way of context in which these thoughts have been developed: suppose one is concerned with the nature of the consumer's ties into the service system provided locally and the larger system as well, limiting one's focus to the Type A questions set forth on page (1). (What services are used? for what purposes? in what contexts? and the like). Suppose, further, that the family is regarded as the consuming unit, and that family differences on a number of dimensions are expected to influence their behavior vis-à-vis the service system. Some of these critical dimensions may be: stage in the family life cycle; family size; socioeconomic status; location in relation to major population center; and involvement in the labor force, the service system, and/or other community affairs.

In the context of this hypothetical and relatively simple study of the consumer and the human service system, let us examine some problems and/or opportunities for extracting meaningful results out of the mass of data one may easily assemble.[4]

Household or individual as unit of analysis. The arguments set forth on pages (78-79) for considering the household as the population element in a survey of consumer use of services also support treating the household rather than the individual as the unit of analysis.

Part of the argument is based on the concept of the family/household as the primary consuming unit for the human services (the notion of the family as a set of interdependent individuals with shared resources and service needs, and the tendency for unmet individual needs to give rise to increased family concerns). If one accepts this concept of the consumer-human service system interface, there is little doubt that the household must usually be treated as the unit of analysis and that attention must be given to defining and measuring family-level variables. However, there may well be interest in summarizing some data for individuals in the case of services provided directly to individuals, such as health or educational services, or services for adolescents or the elderly.

[4]In a preliminary study at one research site, a partial coding of data produced 14,000 data bits representing only thirty-five families.

Statistical arguments favor treating the household as the unit of analysis regardless of whether services are used by the unit as a whole or by the individual. If households are selected at random, each has the same chance of being chosen as any other, regardless of household size. However, an individual living alone has only one-tenth the probability of being selected as does an individual in a ten-person family. In any sample of individuals acquired through simple random or cluster sampling of households, there will be a disproportionately large number of persons from large families and a disproportionately small number from one- or two-member families. Results of data analysis from such a sample will be subject to question whenever size of family is a likely source of variance. Even if size of family is taken into account in a given analysis, there will be distortion due to unequal clustering effect (strong when size of family is large and absent when size is only one).[5]

Level of abstraction desired in variables. Continuing with the suggested focus on the nature of the consumer's ties to the service system, the researcher may wish to identify characteristics of families tied into the health service system for young children. Possible questions are whether the family is more likely to utilize well-child clinics for preschool innoculations for first-born or later children; if the family is large or small, poor or well-to-do, living near to or remote from a clinic; if there is a single parent or two parents in the household; if the parents are younger or older; if family members are or are not involved in the child service system as volunteer or paid workers. With this example one can conjure up an almost endless series of hypotheses about the predictive value of family demographic variables on a whole host of indicators of health service use and satisfaction, as well as perceived barriers to obtaining needed services. Any one of the tables or statistics resulting from such an analysis may be interesting in its own right. However, to arrive at useful generalizations from such a voluminous report would be a very difficult and time-consuming task.

An alternative approach is to identify variables of a higher level of abstraction rather than focus on single elements of the service system. Family differentiation with respect to preventive health contacts is one such higher order variable. Moving to this level of abstraction, use of well-child clinics for preschooler inoculations is viewed as one of a set of indicators of the variable. Other components of differentiation with respect to preventive health contacts may be: use of well-child clinics for physical checkups; use of a pediatrician in his office for either inoculations or physical checkups for either preschoolers or older children; use of a family physician, internist, gynecologist, or other medical specialist for a specified preventive health purpose; use of laboratories, clinics focusing on detection of disease or organic disorders, and other elements of the health subsystem that may contribute to preventive health.

At a still higher level of abstraction, the variable definition may be expanded to include participation in health education programs whether offered by the health or the education subsystem, as well as participation in special programs designed to improve the diet of the elderly or the poor (e.g., meals-on-wheels or expanded nutrition education program).

It is hypothesized that family differentiation with respect to preventive health contacts will be a function of family socioeconomic status as measured by in-

[5]See discussion of relative homogeneity of family/household members on page 79. See also discussion of effects of cluster sampling on variance in *Sampling Opinions: An Analysis of Survey Procedure* by Frederick F. Stephan and Philip J. McCarthy. New York: Wiley (1958), pp. 194-207.

come, educational, and/or occupational level of adults, but that the predictive power of the socioeconomic variables will vary for families at different stages of the family life cycle. It is expected that they will be least effective as predictors for families composed primarily of young adults and preschool children, and most effective for families constituted entirely of adults and/or elderly members. It is hypothesized, also, that family differentiation indexes will be positively correlated across service subsystems. Families more differentiated with respect to use of the diverse elements of one subsystem are expected to be in a better position to make use of other subsystems, if the need arises, than are those families who are familiar with only a few elements of any subsystem.

If higher-level variables of this sort are to be useful in data reduction, care must be taken to arrive at both conceptual clarity and precise operational definitions. Young and Young define differentiation as "the degree to which a system can process a diversity of information."[6] This definition provides a basis for conceptualizing family differentiation variables with potential value in studying consumer-service system interaction. Operational definitions will necessarily be more complex than those provided by the Youngs, who have depended to a large extent on Guttman unidimensional scaling to determine what the components of a particular measure of family differentiation will be. For example, our measures will need to take into account at least these peculiarities of the human service system: for some services the target is the household while for others it is the individual; some individual services are age- or sex-specific, thus making their use dependent partially on family composition; and communities vary in the components of the service system that they provide.

The resources needed to develop and validate measures for a substantial number of variables of the level of abstraction suggested in this discussion may be greater than many surveys can afford. It will be especially difficult to make the time commitment if the study is designed for local use, since there is always pressure to make the report available.

Regional research seems to offer possibilities for this approach to data reductions; responsibility for development of measures can be shared among interested members of the technical committee.

Summary

The issues and problems considered in this paper cluster around several perplexing decision points in planning a study of consumer-service system interaction. Some were explicit agenda items for the NE-77 technical committee over a two-year period. Others seldom surfaced, but persisted as part of the hidden agendas of a minority of the committee members—at times a minority of one.

The major questions raised in the paper are these:

(a) Do the researchers share a common orientation? What impact will their orientation(s) have on the research? Can consumer surveys contribute to the assessment of service quality?

(b) If a consumer survey is to be undertaken, what are the boundaries of the population of interest? What is to be considered the basic population element?

[6]See Frank W. Young and Ruth C. Young, The differentiation of family structure in rural Mexico. *Journal of Marriage and the Family*, 30 (1): 155-161, February 1968.

(c) How can a survey be planned to cope with complexities inherent in a study of consumer responses to the mix of services in a given service system: with limitations in the consumer's perception of the service system, inadequacies of the system-level terminology, and complexity in the system itself? How can an instrument developed for data collection in several control units be made relevant to each?

(d) How can meaningful results be extracted from the mass of data to be generated by a consumer survey?

These are seen as problems likely to arise in most research in which service mix is to be studied from the point of view of the consumer. Sampling problems are not discussed, since they are relatively minor when one is working in a single control unit or when each of several control units is to become the focus of a case study. The NE-77 technical committee agreed to the case study approach, although it is something of a paradox to speak of a sampling survey within a case study.

Sampling selection will be a major problem if researchers, in more sophisticated studies of consumer-service system interaction, attempt to draw probability samples from larger populations (e.g., with state or region as population boundary). The control unit concept will still be relevant, since it provides a major part of the operant service system for its residents. Sampling of control units, however, will have to take into account that each represents only a small segment of the network of service systems and subsystems encountered in the larger population.

THE ROLE OF CASE STUDY APPROACH IN COMMUNITY SERVICES RESEARCH

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In an age of high-speed computers and complex mathematical modeling, a case study approach may seem an anachronism to some. However, an examination of some of the advantages and limitations of such an approach will illustrate why it is appropriate at this time in the study of community services.

It was the decision of the NE-77 technical committee to study social services as they exist in a community context. In addition, rather than studying single services in isolation, it was decided to study the mix of services, i.e., the range and interrelationships among all social services. It seemed advisable to maintain a holistic approach in the preliminary research, and not to be subject to premature closure on specific variables which may affect service delivery. A case study approach not only allowed this posture, but it also permitted each researcher to examine first-hand a service delivery system.

Selltiz et al. suggest that there are a number of reasons why one might want to do a case study.[1] Among others, they discuss these: the enumeration of problems considered important by persons other than professional researchers, familiarization with the research context or setting, the establishment of research priorities, the formulation of hypotheses to be tested in future research, and the clarification of concepts. Obviously each is important in this research, especially since none of the researchers has studied social services in the depth and breadth attempted in this project.

The current trend in social and economic research is to have a small number of pieces of information for a lot of observations. However, knowing values on a few selected variables for a large number of cases seldom allows one to see a problem from the point of view of the practitioner. While many times insights derive from being "outside" a problem as is the situation with most academic research, the contrast with the "inside" view which hopefully will come from a case study approach is useful, and, the committee thinks, necessary.

By helping to clarify concepts and to formulate hypotheses, a case study provides a firm basis for large-scale comparative studies. One important by-product is to assist in providing a clearer meaning to more generally available empirical indicators such as data from the census.

An indepth study also gives a feeling for process and change over time. Such a perspective may be lacking in statistical analyses, even when these studies employ data for more than one point in time. Variables or factors in effective service delivery do not simply attain certain levels, but rather the variables interact in a time dimension. Specifying these interactions statistically becomes particularly problematic where there are as many variables as may be assumed to be operating in communities with respect to the numerous services under consideration. Having first-hand experience with a particular community will give some idea of where to look for such interactions in later analyses.

Case studies are not without their limitations, however. Probably the most generic problem is the false sense of certainty which may result from such a study. By being closely involved with the situation, the observer may be unable to separate the uniqueness of the particular phenomenon from general factors. Closely related to this is the tendency to extrapolate unwarrantedly. Very simply, one cannot generalize from a few case studies; that is, it is not possible to generalize in a statistical sense. Such an approach can be useful in developing more general propositions or hypotheses, as has been argued above. But because it selected only a few communities throughout the region for indepth study, even though those communities were chosen carefully, the committee has avoided making statements about the region *in toto*.

To reiterate, the case studies are meant to generate insights and to sensitize the researchers to the problem under study. The aim is to generate hypotheses which will be tested in future research.

[1]Claire Selltiz, Marie Jahoda, Morton Deutsch, and Stuart W. Cook, ***Research Methods in Social Relations***, Revised One Volume Edition (Holt, Rinehart and Winston, New York, 1959).

USERS OF RESEARCH RESULTS AND SEQUENCING OF EVENTS IN RESEARCHING COMMUNITY SERVICES

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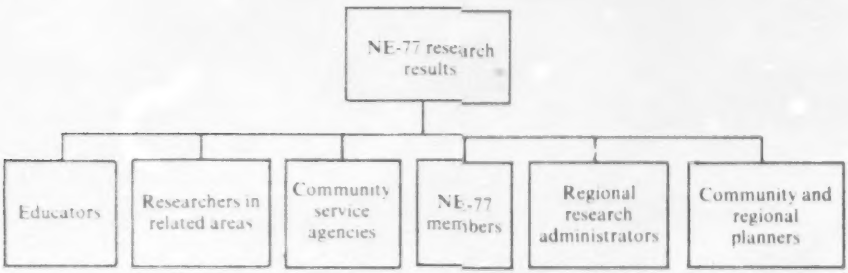
Users of Research Results

The need of six major client groups can be met through regional research like NE-77 if properly designed. These include: (1) those that will make the results a part of their educational programs (example: Cooperative Extension and classroom instruction); (2) those that are conducting related research (example: other regional research technical committees and state and federal researchers concerned with rural development); (3) agencies that are providing community services; (4) community and regional planners; (5) NE-77 technical committee members themselves; and (6) administrators responsible for rural development research (Figure 1). Each of the six is discussed below.

Figure 1. Audiences for the results of NE-77 research.



(1) To meet the immediate needs of educational agencies researchers should be clearly aware of the questions that these agencies are discussing with their students and others. The research results should also identify additional issues that educational agencies can deal with in their program. Major questions being considered within the NE-77 framework include mixes of community services, types of agencies that provide community services, how agencies relate to each other, how services are financed, and how consumers of services perceive and use them. As educational agencies are able to provide research-based an-

swers to these questions, the general public and policy makers become better informed on how the provision of services affects society and its development.

(2) The interests of researchers who are conducting studies that are closely related to the delivery of community services are, in part, much the same as those of educators. These researchers can make direct use of data being developed by NE-77. Researchers active in other aspects of community development can use answers to questions regarding the roles of services in community development activities. Researchers are interested in the techniques used by NE-77 to generate data. Thus, NE-77's output becomes input into other research efforts.

(3) Results should provide service delivery agencies with a better perspective of themselves in relation to the total service mix of which they are a part. From an agency's standpoint, it supplies services which may complement or compete with the activities of another agency. These relationships and their potential effects on service delivery in an area can be elucidated by data being developed.

(4) The informational needs of community and regional planners for the research findings of NE-77 can be met through existing Cooperative Extension education programs and through direct access to the output of state projects and regional reports. At the State level many of the researchers can, through established Extension contacts and media, make their findings readily available to planners. However, results can also be made available through presentation of papers at meetings of planners, articles in planning journals, research reports, and briefings.

(5) As individual technical committee members generate research results, the NE-77 group as a whole becomes an important audience for the individual member outputs. The technical committee members are responsible for the assemblage of data in their respective states and for development of an integrated analysis that is applicable to the region. What the individual outputs are depends on what the individual members are asked to do. In the case of NE-77, states were asked for consistent data that can be collected through uniform questionnaires.

(6) Finally, research administrators have an excellent perspective from which to relate the results research to rural development research activities in the region. To achieve closer research coordination of state research efforts, administrators have suggested the appointment of regional research project managers with responsibilities both for outputs and for research input compliance. In addition, more and longer meetings of technical committees have been proposed by administrators. Finally, changes are being proposed for the sequencing of events for the development and conduct of regional research.

Sequencing of Events in Researching Community Services

Conceptually, the sequencing of events in researching community services involves the basic steps of identifying and justifying the research problem, conceptualizing specific research objectives and hypotheses, developing the data collection process, collecting the necessary data to test the research hypotheses, analyzing the data, and disseminating the empirical results. There are at least five important factors that affect the orderly and efficient manner in which regional research is conducted.

First, regional research groups invariably include individuals with differing levels of interest and commitment to the project. While the potential payoff

from regional research is high, "the law of collective action" does reduce the probability that all individual researchers will be able to synchronize their efforts over the entire course of the project.

The second difficulty is that of developing effective communication and appreciation among researchers representing different disciplines. Although not all regional research teams are multidisciplinary, most of those in the area of rural development are. At one time or another at least four disciplines have been represented on NE-77: sociology, economics, social psychology, and political science. Although this multiplicity of disciplines in research efforts is an overall strength, it can cause temporary impediments in reaching closure on a particular research activity and in terms of all researchers being able and willing to simultaneously engage in the same activity.

Third, regardless of the discipline or disciplines represented, researchers will likely vary in the importance and interest they attach to the different steps or phases of scientific inquiry. For example, some will want to spend more time than others in conceptualizing and specifying hypotheses while others will place relatively greater importance on perfecting data collection instruments.

Fourth, regional research efforts frequently experience some turnover in research personnel. While this does not usually create major problems, some slippage is bound to occur.

The fifth difficulty is the uncertainty associated with any "plan of work"—a situation which becomes particularly acute when a relatively unexplored theme is being investigated. NE-77's focus on community services is such a theme. Although a certain amount of prior research on various aspects of community service has occurred, the amount of intellectual capital is small in comparison to such areas as farm management, marketing, agricultural policy, etc. This lack of intellectual capital causes various phases of the research to frequently run into "dead ends," and to fall behind agreed-upon time schedules. NE-77 experienced one complete reorientation midway through the project. This reorientation involved a shift away from the investigation of a series of individual services to a case study analysis of "service mix."

Many groups and individuals in the Northeast have given considerable thought to how such types of problems can be minimized. The NEC-14 Rural Development Advisory Committee for Regional Research and Dr. Harold R. Capener have been particularly active in this regard.

Stages in the Orderly Development and Conduct of Regional Research Projects[1]

The following necessary steps must be taken in order to implement the various stages in rural development regional research projects. These steps are set forth in three critical stages. The first stage should be supported for travel and working conferences. In the second stage the project would be designated and funded as a temporary regional project. This would move the temporary project systematically along to the point where a research proposal is prepared and presented for peer review and for administrative approval as a regular regional project. The third stage begins when a project has been fully approved and funded.

[1]Excerpts from a report presented to the Northeast Agricultural Experiment Station Directors by the NEC-14 Rural Development Advisory Committee for Regional Research, June 19, 1973.

First Stage

1. Problem explored.
2. Problem identified.
3. Coalescence of scientists to work on the project.
4. Initial and continuing review and evaluation of the literature and current research.
5. Development of proposal for "Northeast Temporary Project."

Second Stage

6. Conceptualization and identification of hypotheses.
7. Plans for instrumentation and design of research tools and methods of analysis.
8. Preparation of budget.
9. Completion of project proposal for peer review and administrative approval as a regular Northeast project.

Third Stage

10. Final specifications of tasks set forth in items 1-9 above.
11. Collection of data.
12. Analysis of data.
13. Publication and dissemination.
14. Interpretation of findings to user audiences.
15. Project completion—feedback loop to new problems.

Suggestions for Improving the Management Component of Rural Development Regional Research[2]

A compelling general observation is that there is a need to set forth in a system context the sequential stages in the life cycle of a regional research project. A profile of these stages with a suggestion of the differential time requirements is needed to adequately deal with each stage.

In the first and second stages the decisions are largely administrative and procedural. Usually special assignments are made to key individuals for staff work and development of proposals. Those involved in decisions at this stage are not necessarily the research scientists who will actually be involved in conducting the research. Given project approval the real process of coalescing the working scientists around the project begins.

The formation of the research team is crucial to success. Special care should be taken to sort out the nature of the research commitment to the project. There must be:

(1) personal commitment backed up by scientific man years and money.
(2) interest among available personnel to do work of a selected nature.

In the various stages of a regional project some of the critical management components are as follows:

1. Initially the chairman along with the members needs to lay out the stages in the life cycle of the regional project in order to effect proper orientation, division of labor, allocation of resources, and efficiency of planning.

[2]Excerpts from a statement developed by Harold D. Capener, Department of Rural Sociology, Cornell University.

2. The members need to identify the particular roles in relation to the stages that each desires or feels himself to be especially competent to perform and contribute.
3. The committee needs to seriously examine the requisites of time and resources needed for the performance and completion of each of the stages in the cycle. A peculiar pattern seems to exist whereby regional meetings are scheduled for about two days without sufficient reference to the work to be done or the particular stage in the life cycle of the project being addressed. Sober reflection would suggest that the length of the meetings be dictated by the tasks to be accomplished rather than gauging the work to the length of the meeting.
4. Perhaps the greatest single weakness in regional research is too little time given (or taken) by the research team to carry out the critical functions of stage five in the cycle. A more thorough procedure is called for in identifying the parameters of the problem; delineating the dependent, independent and intervening variables; mapping out the conceptual and theoretical areas that undergrid the work to be undertaken; defining the population concerned, the nature of the sample, the techniques of obtaining data; etc.

   Attempting this complex task in two or three days usually squeezed from a very busy teaching schedule in the midst of the quarter or semester has not proved successful.

   In reality such an undertaking, given what we know about the interaction and communication processes of a new group, might more properly take two weeks and this during a freeer time like the summer.

   The task is normally compounded by a multidisciplinary mix which presents special problems of understanding each other. It is necessary for the group to search out the commonalities to theory and conceptual tools in order to build up the basic research design that sets the stage for all else that follows.
5. Stage eight also requires a more specialized and concentrated input. The mode and techniques of analysts have far-reaching effects on the availability, interpretation, and utilization of the data. Much of the data may be centralized for analysis at one station. At the same time, freedom, flexibility, and encouragement for participating scientists to develop special analysis for their individual states must be provided. The data analysis team should be formed well ahead and assigned the task of preparing the plans of analysis for consideration and approval by the regional research committee.
6. At present a structural bind exists which prevents those stations with limited numbers of social scientists from participating in regional research. Operationally the only legitimate mechanism for joining a regional project is through allocating scientific man years (SMY) with an accompanying budget. This poses a critical constraint on those states that would like to participate but lack available staff. Often the nature of the regional problem will ideally require sample data from those very states in order to adequately represent the realities of the region.

   Other operational means need to be explored to provide more flexibility. One option, for example, might be for a station to indicate its desire to be included in a regional project and to contribute a "fair share" of budget to pay for work of definition of problems, research design, development of investigation tools, data collection, analysis, and publication. The amount of

this "fair share" could be reasonably established by the research committee. Such a share contributed by a State might be used by the committee to sponsor its intensive "research design phase," or to hire an extra full-time research associate, a postdoctoral candidate, graduate students, or field interviewers. The "fair share" contribution would entitle the station to all the rights, privileges, benefits, recognition, and so on, now assured by the current SMY procedure. In fact, in some cases, it may be a more valid and functional entree than a very nominal SMY.

7. There is a general tendency (perhaps done in the name of democracy) to elect new officers on an annual basis without reference to the particular stage or cycle of development the regional project is in. It would seem more logical to relate the term of service of officers to the completion of logical tasks than to the annual calendar.
8. While the technical management decisions pertinent to each of the stages in the cycle are a responsibility of the chairperson of the technical committee, a great deal of support and assistance can be rendered the individual research scientists by the station directors and the administrative advisers. Such support would flow from administrators appreciating the significance of the different stages in the cycle and gaining a perspective of the inputs required commensurate with the various stages. Thus travel budgets and subcommittee involvement would be understood as the "hardware" inputs for social science research that buildings, laboratory animals or expensive equipment represent for the physical and biological sciences.

   If the stages in the cycle were purposely and consciously utilized as an implementing guide for planning and management of regional research projects, much of the muddling and indecision about organization, division of labor, program agendas, direction, and progress would be clarified. This would especially be true in the process of changing membership and leadership on the projects.

Regional research is one of the most promising and viable tools in providing system level perspective, macroscale analysis, and cumulative and comparative advantage. For rural development research these are ingredients.

Through proper design and analysis, problems can be understood in the locality orientation of small units up to the totality orientation of system level function. Research results proceeding from more vigorous management procedures will yield more promise in terms of adding to the needed body of knowledge to rural development know-how and to useful policy and application.

Much of the failure of social science regional research to measure up to expectations in the past is due to gaps and loopholes in the planning and management process. Forestalling these deficiencies through improved combinations of research management techniques will not only produce stronger research results but will place the research stations and scientists in a stronger, more viable position to respond and help resolve the pressing problems of rural America.

APPENDIXES

APPENDIX A

Array, Magnitude, and Distribution of Human Services

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I. Health Services

A. Medical Specialities

1. General Practitioner
2. General Surgeon
3. Internal Medicine
4. Obstetrician-Gynecologist
5. Pediatrician
6. Radiologist
7. Ophthalmologist
8. Pathologist
9. Otolaryngologist
10. Urologist
11. Allergist
12. Colon and Rectal Surgeon
13. Plastic Surgeon
14. Neurologist
15. Child Psychiatrist
16. Pediatric Cardiologist

B. General Hospital and Related Services

1. Outpatient
2. Emergency
3. Surgical
4. Intensive Care
5. Obstetrics
6. Pediatrics
7. Laboratory
8. Radiology
   a. Diagnostic
   b. Therapeutic
9. Pharmacy

C. Moderately Specialized Hospital Facilities and/or Services

1. Extended Care
2. Nursing Home
3. Physical and occupational therapy and rehabilitation
4. Psychiatric and mentally retarded
   a. Individual therapy
   b. Group therapy
   c. Behavior modification
   d. Child evaluation

D. Provision of Periodic Clinics and Health Programs

1. General Health Screening Clinics
2. Venereal disease
3. Pre-natal
4. Well-baby
5. Immunization
6. Hearing
7. Visual
8. Dental
9. Cardiac
10. Tuberculosis

E. Regulation and Inspection Regarding Environmental Health Services

1. Sewer and garbage disposal
2. Water quality
3. Air quality
4. Food, beverage, and lodging establishments
5. Fire and general safety of public buildings

F. Other Health Services and Agencies

1. Ambulance service
2. Public health nursing
3. Home health services (Visiting Nurse)
4. Health equipment rental (crutches, wheelchairs, etc.)
5. First-Aid instruction
6. Comprehensive health planning
7. Medicaid and Medicare
8. Health Education

II. Social Welfare Services (Cancer and Heart Societies, etc.)

A. Income Supplements

1. Unemployment insurance
2. Public assistance
   a. Old Age assistance
   b. Aid to the temporarily and permanently disabled
   c. Aid to the blind
   d. Aid to families with dependent children
   e. General

3. Veterans' pensions
4. Emergency aid (e.g., Salvation Army)

B. Manpower Development and Training (Specific Programs)

1. Operation Mainstream
2. New Careers
3. Job Opportunities in the Business Sector
4. Job Corps
5. Neighborhood Youth Corps
6. Green [illegible]mb

C. Nutrition Programs

1. Meals on wheels
2. Congregate meals program
3. School lunch
4. Food stamps
5. Commodity distribution

D. Family Welfare

1. Day care
2. Adoption services
3. Protective—child abuse
4. Homemaker Services
5. Foster parents for—
   a. Children
   b. Elderly
   c. Big brother, Big sister
6. Counseling and Education
   a. Marital
   b. Child guidance
   c. Draft
   d. Sex, abortion
   e. Alcoholism
   f. Drug abuse

E. Housing Services

F. Legal Services

1. Aid to indigent (public defender)
2. Probation program
   a. Juvenile
   b. Nonjuvenile
3. Legal Aid Clinic
4. Civil and Human Rights

G. Services to the Aging

1. Friendly Visitor
2. Residence Units and Specialized Facilities
3. Clubs and associations

H. Recreation and Cultural Affairs

1. Recreation Facilities
   a. Parks
   b. Pools
   c. Golf Courses
2. Organized programs
3. Libraries and bookmobiles
4. Museums and art galleries

I. Other Social Welfare Services and Agencies

1. Homes for unwed mothers
2. Crisis centers
3. Emergency charities
4. Community Action Agency
5. Sheltered Workshop

III. Education

A. Preschool
   1. Head-start
   2. Nursery school
   3. Kindergarten

B. Elementary and Secondary

1. Academic Programs
   a. Graded vs. Ungraded
   b. Tracking—None through advanced placement
   c. Diversity of language, math, science, arts offerings
2. Vocational Programs
   a. Agricultural—Home Economics
   b. Business or Commercial
   c. Trade-Technical
3. Special Programs
   a. Handicapped, e.g., blind, deaf, mentally retarded (trainable or educable)
4. Pupil Personnel Services and Other Handicapped
   a. Remedial speech, reading
   b. Health school nurse, doctor, dentist, physical therapist
   c. Counseling psychologist, psychiatrist, social worker
   d. Intercultural programs
5. Extracurricular Activities
   a. Sports
   b. Field trips and tours
   c. Debate
   d. Music and art

C. Adult

1. Academic Programs
   a. Night school
   b. Community college

2. Vocational
   a. Special training
   b. Programs for the handicapped
3. Counseling
   a. Job placement

Magnitude: Estimates of the Amount of Service Available

I. Organization

A. Number of Organizations or Providers
B. Size
   1. Employees
   2. Clients
   3. Budget

II. Consumers or Clients

A. Groups of Clients
   1. Number of potential groups
   2. Number of groups served
   3. Percent of potential groups served
B. Individual Clients
   1. Potential number
   2. Number served
   3. Percent of potential served

III. Finances

A. Public Expenditure (Local, State, and Federal)
   1. Total
   2. Per capita
   3. Per client and per potential client
B. Private costs
   1. Total costs to clients
   2. Cost per unit of service to client

Distribution of Human Services

I. Physical Access

A. Location Relative to Population Concentration
   1. Percent of services in central location
   2. Driving time from various locations
B. Availability of Transportation
   1. Public systems
   2. Quasi-public (cabs)
   3. Roads

II. Equity in Distribution

A. Who Receives Services
   1. Eligible Recipients
      a. Income classes
      b. Age groups
      c. Ethnic groups
   2. Actual Recipients
      a. Income classes
      b. Age groups
      c. Ethnic groups

B. Who Pays for Services
   1. Income classes
   2. Age groups
   3. Ethnic groups

C. Correspondence Between Benefits and Burdens
   1. Income classes
   2. Age groups
   3. Ethnic groups

APPENDIX B

The Sampling Procedures Utilized for NE-77

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The nonmetropolitan sector for this regional project was defined as those people living in counties with a 30-percent or greater nonurbanized population. Using this criterion, 245 nonmetropolitan counties in the Northeast were included. A two-stage stratified probability sample of these counties was then conducted. The two dimensions used were: (1) direction of population change, and (2) direction of family income change.

The actual procedures for selecting counties involved the construction of two arrays of the 245 nonmetropolitan counties—one by percentage population change 1960-70, and the other by percentage median family income change 1960-70. Using these arrays, the following types of counties were identified:

(1) Expanding/Expanding (EE)—counties located both in the highest quintile of population increase ***and*** highest quintile of income increase.
(2) Stable/Stable (SS)—counties located both in the middle quintile of population increase ***and*** middle quintile of income increase.
(3) Declining/Declining (DD)—counties located both in the lowest quintile of population increase ***and*** lowest quintile of income increase.

It was assumed that a probability sampling method would result in adequate geographic dispersion. However, two states, Massachusetts and Connecticut, were found to have no counties in the three categories. Connecticut had one county and Massachusetts two, whose rates of population and income change

were close to the limits of one of the three categories to allow their inclusion in the corresponding category.

The following distribution of counties resulted:

Direction of family income change	Direction of population change: Expanding	Stable	Declining
Expanding	Connecticut—1 Maryland—6 New Jersey—3 New York—3 Vermont—4		
Stable		Maine—2 Massachusetts—2 New York—2 Pennsylvania—3 West Virginia—1	
Declining			New Hampshire—1 Pennsylvania—6 Vermont—1 West Virginia—8

For each of the counties identified in the diagonal, minor civil divisions (MCD's) within each were selected such that within EE counties, expanding MCD's were selected; within SS counties, more stable MCD's were selected, and within DD counties, declining MCD's were selected. The criterion for classifying MCD's as expanding, stable or declining was their rank on 1960-70 population change among all MCD's within their respective states. Income data were not available for all MCD's. Thus it was not included for purposes of stratification. Again, quintiles were used and those MCD's in the highest quintile were labeled expanding, those in the middle quintile were labeled as stable, and those in the bottom quintile were classified as declining.

The result of the sampling procedure was selection of 16 potential sites in 10 states:

Connecticut	1 city-town area
Maine	3 towns
Maryland	3 counties
Massachusetts	1 MCD
New Hamphsire	1 county (14 towns)
New Jersey	1 township
New York	1 county
Pennsylvania	2 counties
Vermont	2 multitown areas
West Virginia	1 county